NHS
Blood and Transplant

ANNUAL REPORT ON HEART TRANSPLANTATION

REPORT FOR 2024/2025
(1 APRIL 2015 – 31 MARCH 2025)

PUBLISHED AUGUST 2025

PRODUCED IN COLLABORATION WITH NHS ENGLAND

CONTENTS

Contents

EXECUTIVE SUMMARY

1. Executive Summary

This report presents key data about heart transplantation in the UK. The period reported covers 10 years, from 1 April 2015 to 31 March 2025. The data include number of people listed for a transplant, number of transplants performed and survival rates following heart transplantation; both on a national and centre-specific basis. Data were extracted on 16 June 2025.

Key findings

ADULT HEART TRANSPLANTATION

- On 31 March 2025 there were 264 adults waiting for a heart transplant: 228 on the non-urgent list, 31 on the urgent list and 5 on the super-urgent list. This represented a 6% increase compared to 31 March 2024.
- Of the 264 adults waiting, 45% were on long-term VAD support and 2% were on short-term mechanical circulatory support.
- The 1 year waiting list mortality was 7% on the non-urgent list and 8% on the urgent list (including removals due to deteriorating condition). On the super-urgent list, 12% of patients had died without receiving a transplant by 4 months.
- Median waiting time to heart transplant was 788 days from non-urgent registration, 37 days from urgent registration and 15 days from super-urgent registration.
- During 2024/2025 there were 174 adult heart transplants performed of which 28% were from DCD donors. The number of adult heart transplants performed in 2024/2025 was 13% lower than the previous year in which there were 199 transplants. The proportion of super-urgent transplants increased to 33% from 24% in the previous year, while the number of urgent transplants was 47%.
- The national rate of patient survival following adult heart transplant was 92.9% at 90 days, 89.0% at 1 year and 74.8% at 5 years (including both DBD and DCD heart transplants).

PAEDIATRIC HEART TRANSPLANTATION

- On 31 March 2025 there were 39 paediatric patients waiting for a heart transplant: 22 on the non-urgent list, 17 on the urgent list and none on the super-urgent list. This was 11% higher than on 31 March 2024, and 33% of those waiting were on mechanical circulatory support.
- Median waiting time to transplant was 907 days from non-urgent registration and 144 days from urgent registration.
- During 2024/2025 there were 26 paediatric heart transplants (11 fewer than the previous year) of which 9 were from DCD donors. A total of 23 of the 26 transplants were either urgent or super-urgent.
- The national rate of patient survival following paediatric heart transplant was 94.0% at 90 days, 92.9% at 1 year and 85.7% at 5 years (including both DBD and DCD heart transplants).

INTRODUCTION

2. Introduction

This report presents data on activity and outcomes of heart transplant candidates and recipients between 1 April 2015 and 31 March 2025, for all centres performing heart transplantation in the UK. Data were obtained from the UK Transplant Registry at NHS Blood and Transplant which holds information relating to donors, recipients and outcomes for all heart transplants performed in the UK.

Heart activity results are described separately for adults (aged 16 years or over) and paediatric patients (aged less than 16 years). There are seven heart transplant centres in the UK; six in England and one in Scotland. Five of the seven centres specialise in adult transplantation, one in paediatric transplantation (Great Ormond Street Hospital) and one in both adult and paediatric transplantation (Newcastle). Any transplants carried out at Great Ormond Street Hospital in recipients aged 16 or over are included in the paediatric analysis, and any transplants carried out at adult only centres in recipients less than 16 are included in the adult analysis.

Multi-organ transplants are presented separately in Section 6.5 and are excluded from the rest of the main report.

The time period of analysis covers the introduction of the super-urgent heart allocation scheme in October 2016 (later expanded to paediatric patients in October 2020).

Methods used are described in the Appendix. The centre specific adult survival rates are adjusted for differences in risk factors between the centres. The risk models used are described in the Appendix. The adult heart risk model was revised in August 2022 in consultation with the clinical community.

2.1 Overview

Figure 2.1 shows the number of transplant candidates on the active transplant list at financial year end between 2016 and 2025. The number of people waiting for a heart transplant increased significantly between 2016 and 2020, from 248 to 340. After its peak, the number dropped to 288 in 2024, with a slight increase to 308 in 2025.
.

Figure 2.1 Number of people on the national active heart transplant list on 31 March each year, 2016 to 2025

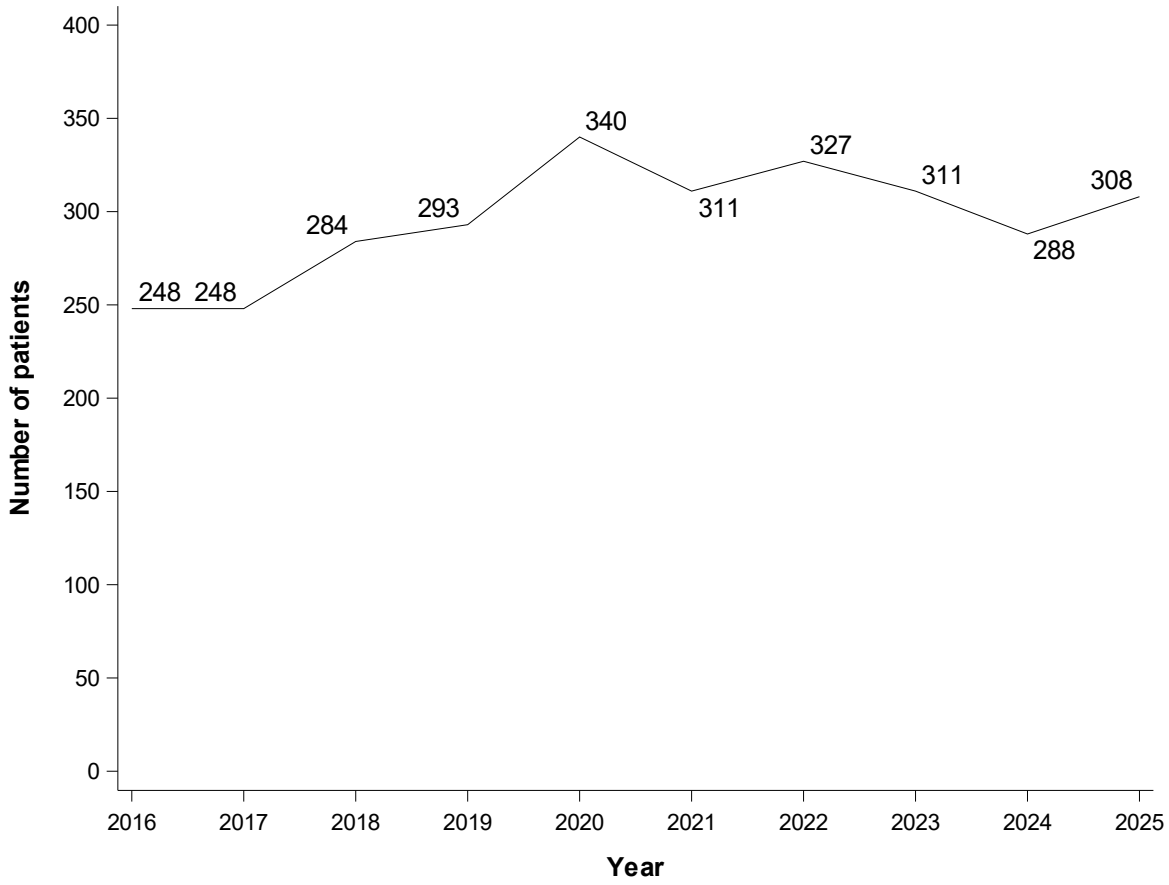


Figure 2.2 and **Figure 2.3** show the number of adult and paediatric patients on the active transplant list on 31 March 2025 at each centre. In total, there were 269 adults and 39 paediatric patients waiting for a heart transplant. These numbers include 5 people waiting for a multi-organ transplant (3 heart and liver and 2 heart and kidney). Newcastle had the highest number of both adult and paediatric patients on the heart transplant list.

Figure 2.2 Number of adults on the active heart transplant list on 31 March 2025, by centre

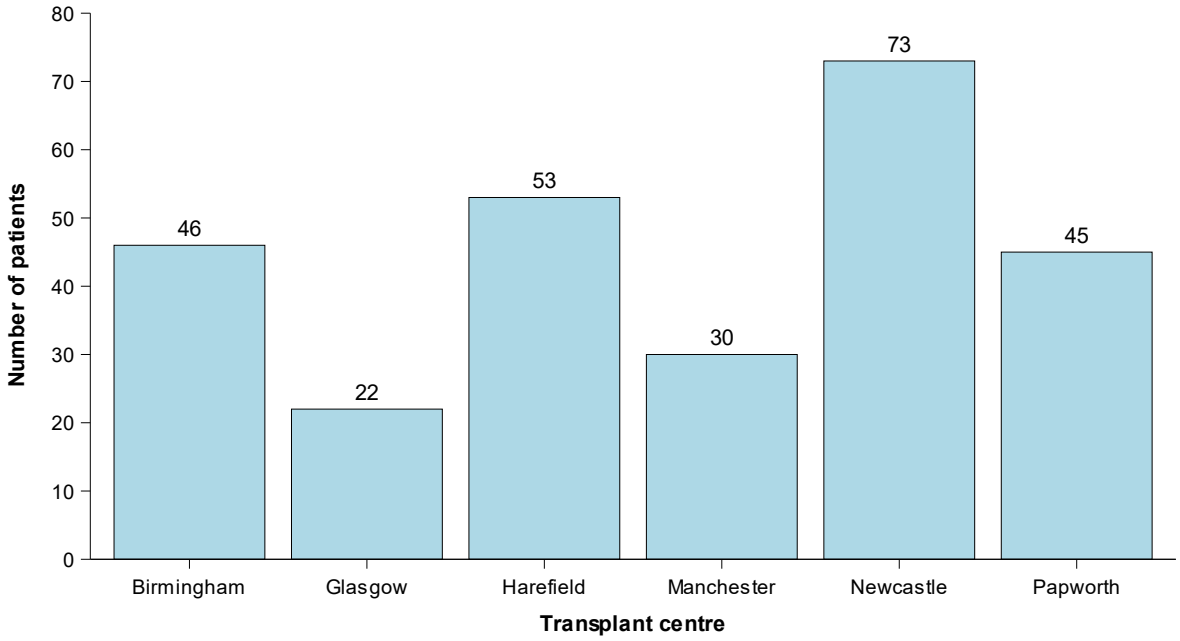


Figure 2.3 Number of paediatric patients on the active heart transplant list on 31 March 2025, by centre

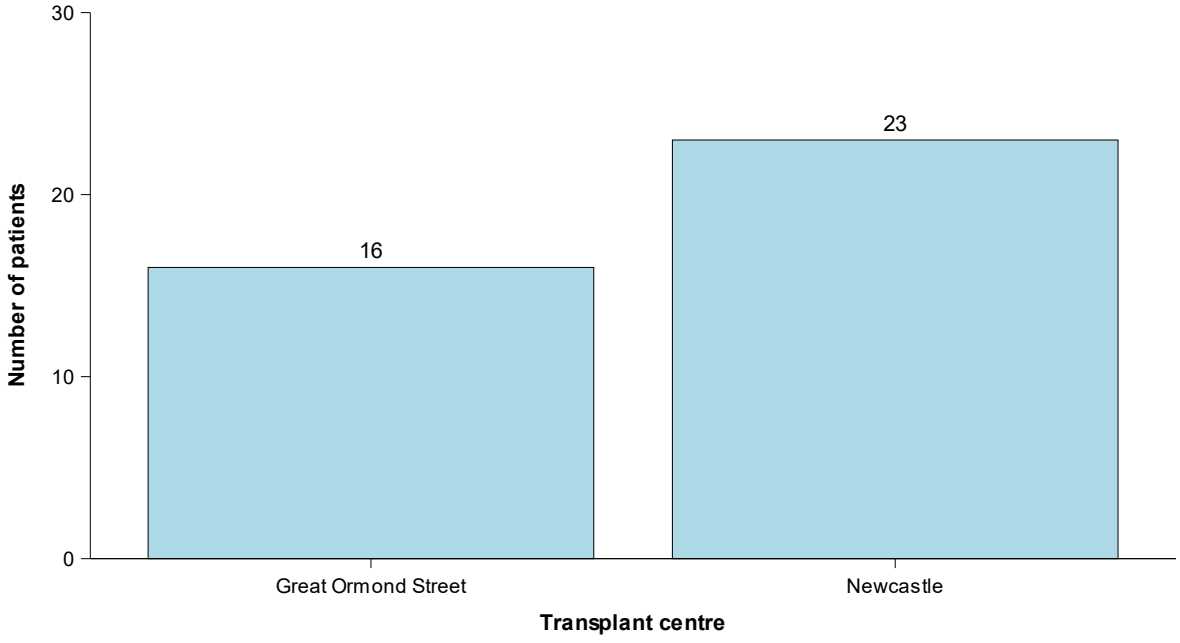


Figure 2.4 shows the total number of heart transplants performed in each of the last 10 financial years (excluding heart-lung transplants but including other multi-organ transplants). The number of transplants last year was 200, 16% lower than in 2023/2024.

Figure 2.4 Number of heart transplants in the UK, by financial year, 1 April 2015 to 31 March 2025

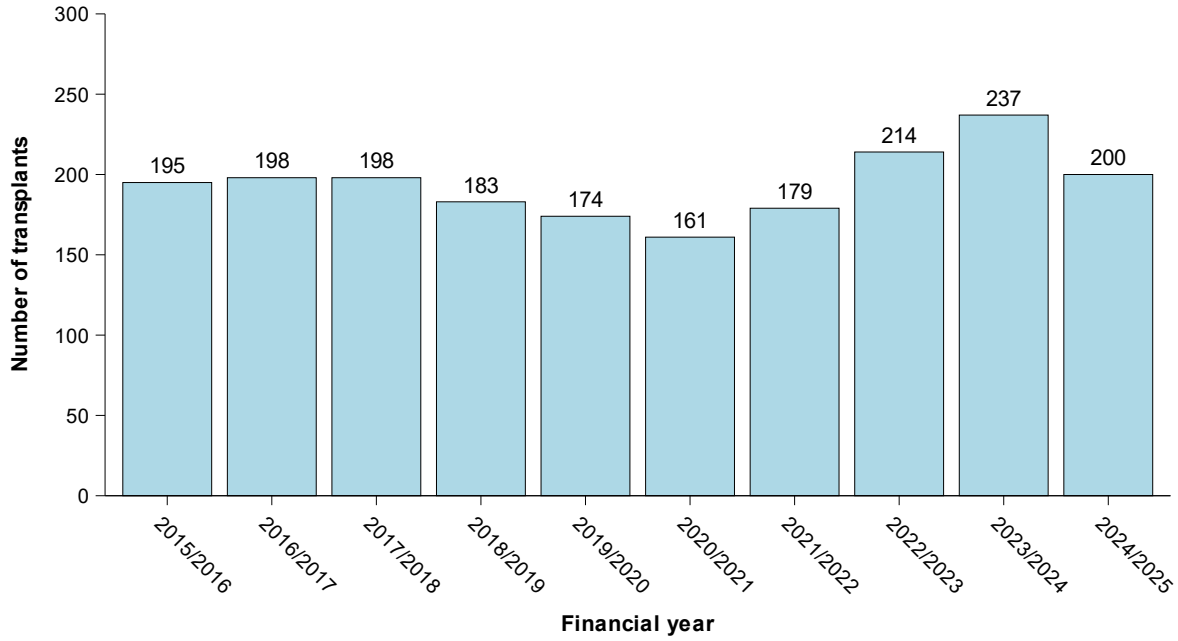


Figure 2.5 and **Figure 2.6** show the number of adult and paediatric transplants carried out in the most recent financial year at each centre. Harefield performed the highest number of adult transplants followed by Papworth. Great Ormond Street Hospital performed the highest number of paediatric transplants.

Figure 2.5 Number of adult heart transplants in the UK, by centre, 1 April 2024 to 31 March 2025

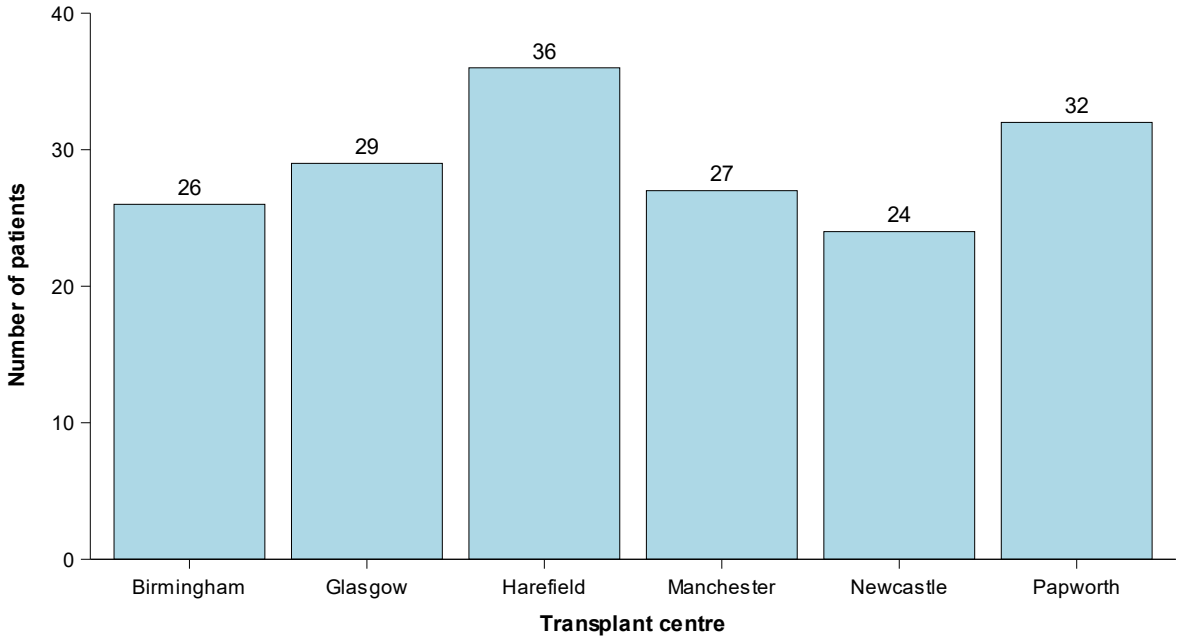


Figure 2.6 Number of paediatric heart transplants in the UK, by centre, 1 April 2024 to 31 March 2025

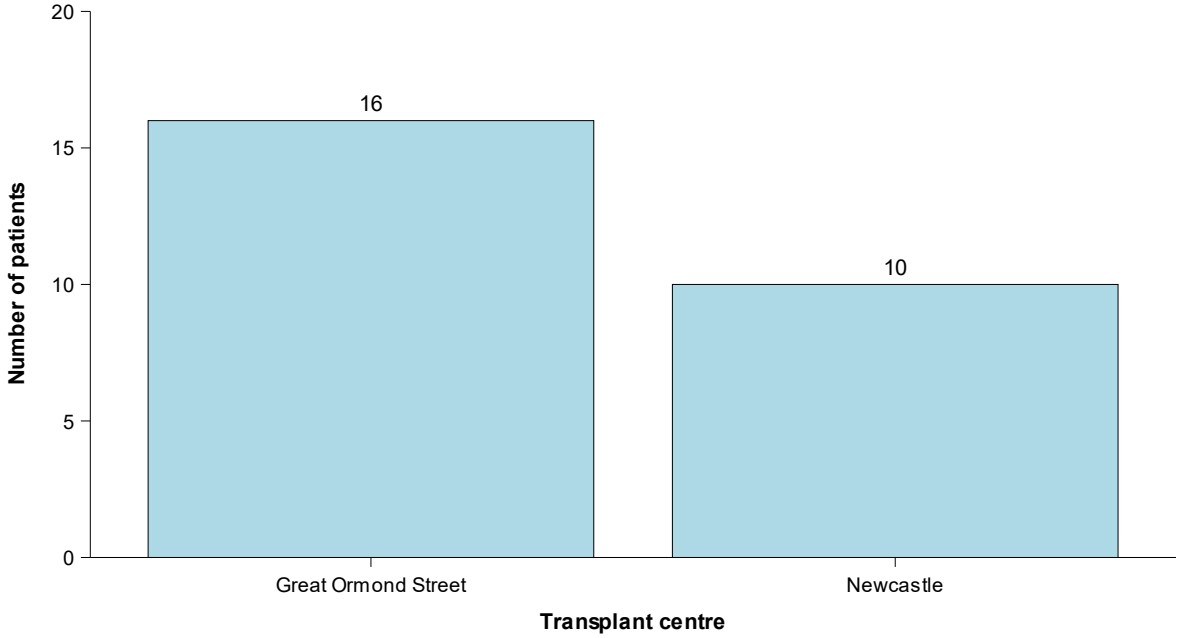
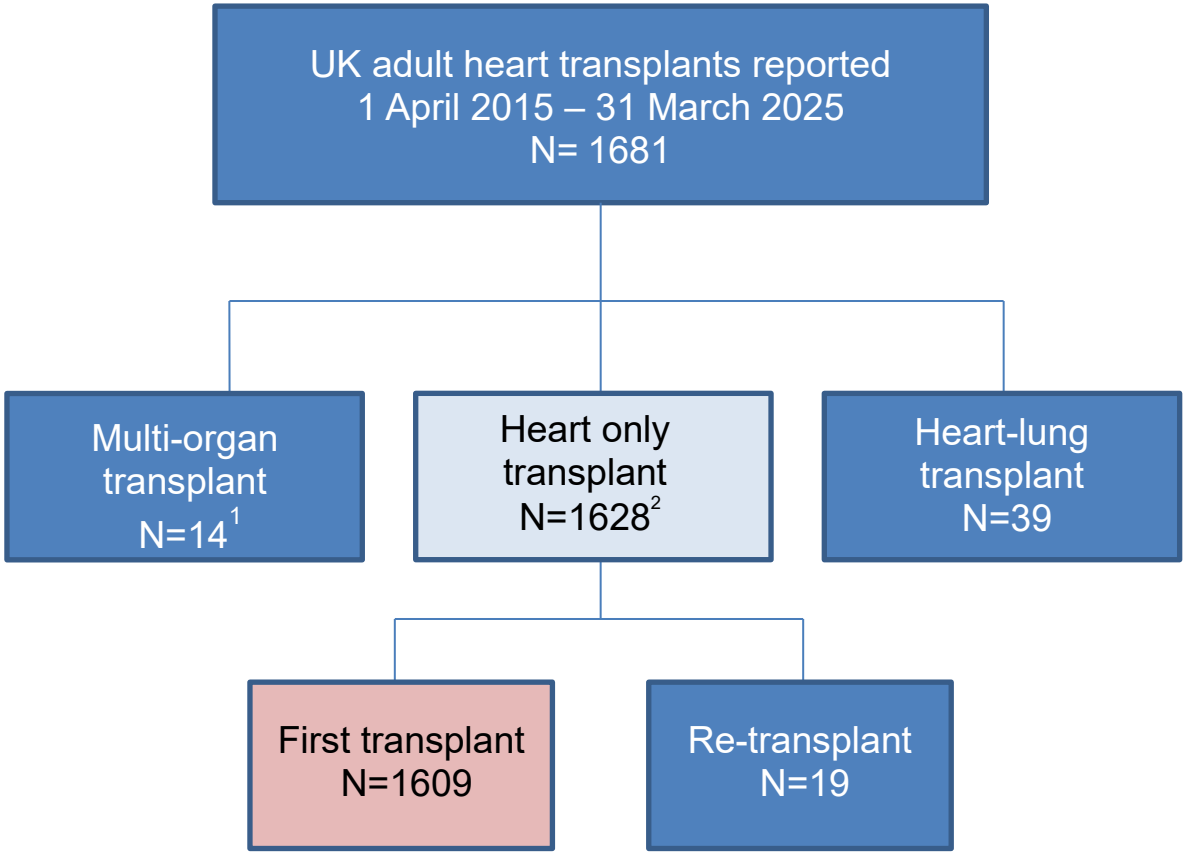


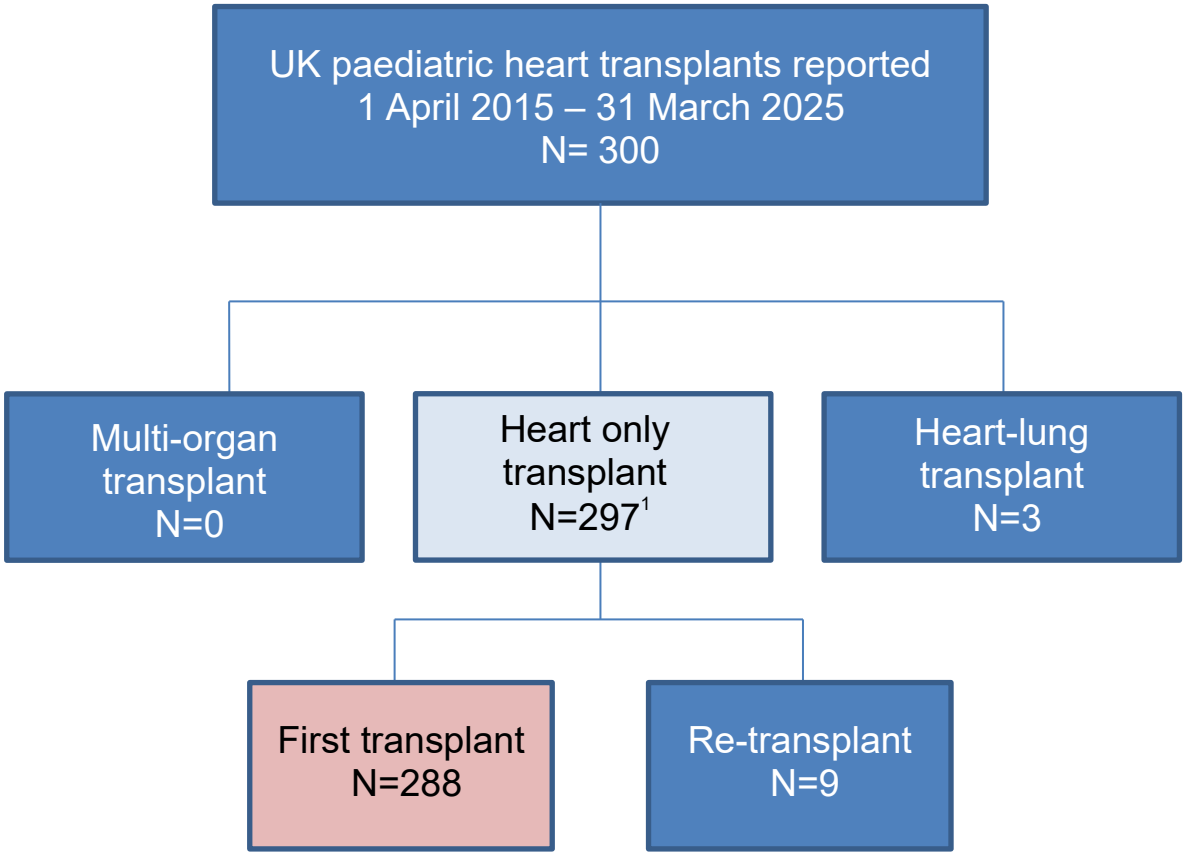
Figure 2.7 shows a breakdown of the 1,681 adult heart transplants performed in the UK in the ten-year period while **Figure 2.8** shows a similar breakdown for the 300 paediatric transplants performed during the same period. Re-transplants are included in the transplant activity sections of this report but excluded from the survival analysis sections. Multi-organ transplants are excluded from the rest of the report apart from the separate multi-organ outcome sections (Section 6.5). Heart-lung transplants are considered in the Annual Report on Lung Transplantation and are excluded from the rest of this report.

Figure 2.7 Adult heart transplants performed in the UK, 1 April 2015 to 31 March 2025



[1] Includes 5 heart and kidney, 9 heart and liver
[2] Includes 323 DCD heart transplants

Figure 2.8 Paediatric heart transplants performed in the UK, 1 April 2015 to 31 March 2025



[1] Includes 33 DCD heart transplants

2.2 Geographical variation in registration and transplant rates

Figure 2.9 shows rates of registration to the heart transplant list per million population (pmp) between 1 April 2024 and 31 March 2025 compared with heart transplant rates pmp for the same time period, by recipient country/NHS region of residence. **Table 2.1** shows the actual numbers as well as rates. If a patient has had more than one registration/ transplant in the period, each registration/transplant is considered. Note that this analysis only considered NHS Group 1 patients. The UK heart registration and transplant rates are 5.0 pmp and 3.0 pmp respectively.

Since there will inevitably be some random variation in rates between areas, the systematic coefficient component of variation (SCV) was used to identify if the variation is more (or less) than a random effect for the different NHS regions in England only. Only first registrations and transplants in this period were considered. The larger the SCV the greater the evidence of a high level of systematic variation between areas. The registration and transplant rates yielded an SCV of 0 in both cases, therefore there is no evidence of geographical variation beyond what would be expected at random. No adjustment has been made for area-specific demographic characteristics that may impact the rates of registration to the transplant list and transplantation such as age and sex.

Figure 2.9 Comparison of heart registration rates (pmp) with transplant rates (pmp) by recipient country/NHS region of residence

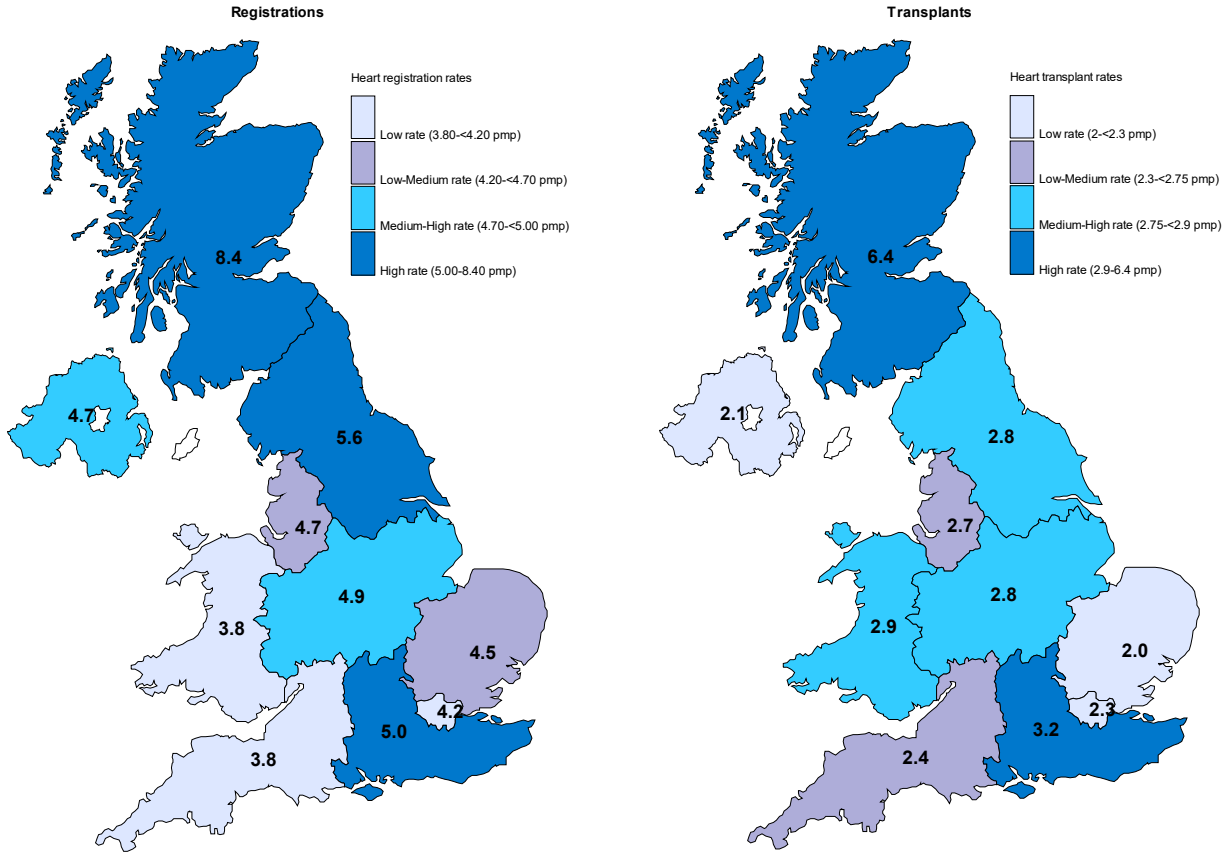


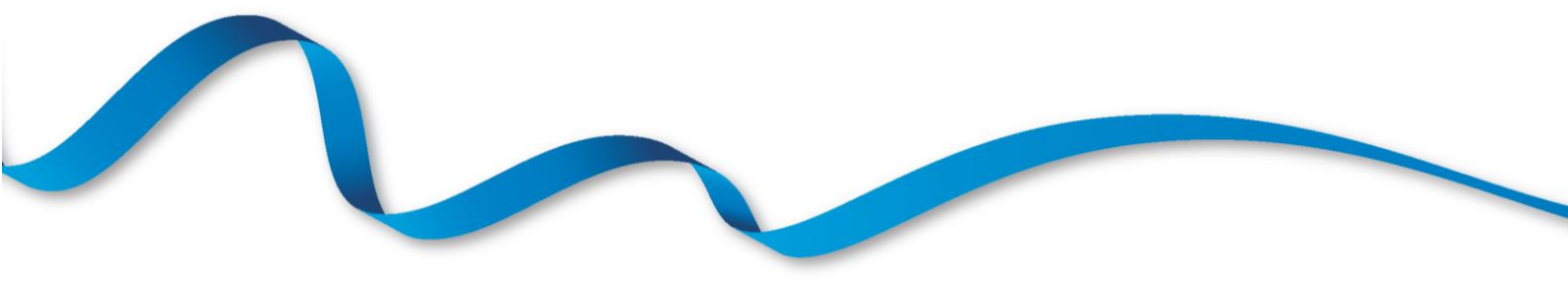
Table 2.1 Heart registration and transplant rates per million population (pmp) in the UK, 1 April 2024 - 31 March 2025, by Country/NHS region

Country/ NHS region	Registrations (pmp)		Transplants (pmp)	
North East and Yorkshire	46	(5.6)	23	(2.8)
North West	35	(4.7)	20	(2.7)
Midlands	54	(4.9)	31	(2.8)
East of England	29	(4.5)	13	(2.0)
London	37	(4.2)	20	(2.3)
South East	47	(5.0)	30	(3.2)
South West	22	(3.8)	14	(2.4)
England	**270**	**(4.7)**	**151**	**(2.6)**
Isle of Man	**0**	**(0.0)**	**0**	**(0.0)**
Channel Islands	**0**	**(0.0)**	**0**	**(0.0)**
Wales	**12**	**(3.8)**	**9**	**(2.9)**
Scotland	**46**	**(8.4)**	**35**	**(6.4)**
Northern Ireland	**9**	**(4.7)**	**4**	**(2.1)**
TOTAL[1,2]	**339**	**(5.0)**	**200**	**(3.0)**

[1] Registrations include 2 recipients whose postcode was unknown
[2] Transplants include 1 recipient whose postcode was unknown

ADULT HEART TRANSPLANTATION

Transplant List



3.1 Adult heart only transplant list on 31 March, 2016 – 2025

Figure 3.1 shows the number of adult patients on the heart transplant list on 31 March each year between 2016 and 2025, split by urgency status of the patient. The number of adults on the active non-urgent heart transplant list increased from 188 in 2016 to a peak of 271 in 2020, before falling to 228 in 2025. The number of adults on the urgent list increased from 19 in 2016 to 31 in 2025. The super-urgent list was introduced in October 2016 and there were 5 adults waiting on this list on 31 March 2025. There has been a recent decrease in the number of adults suspended from the heart waiting list.

Figure 3.1 Number of adults on the heart transplant list on 31 March each year, by urgency status

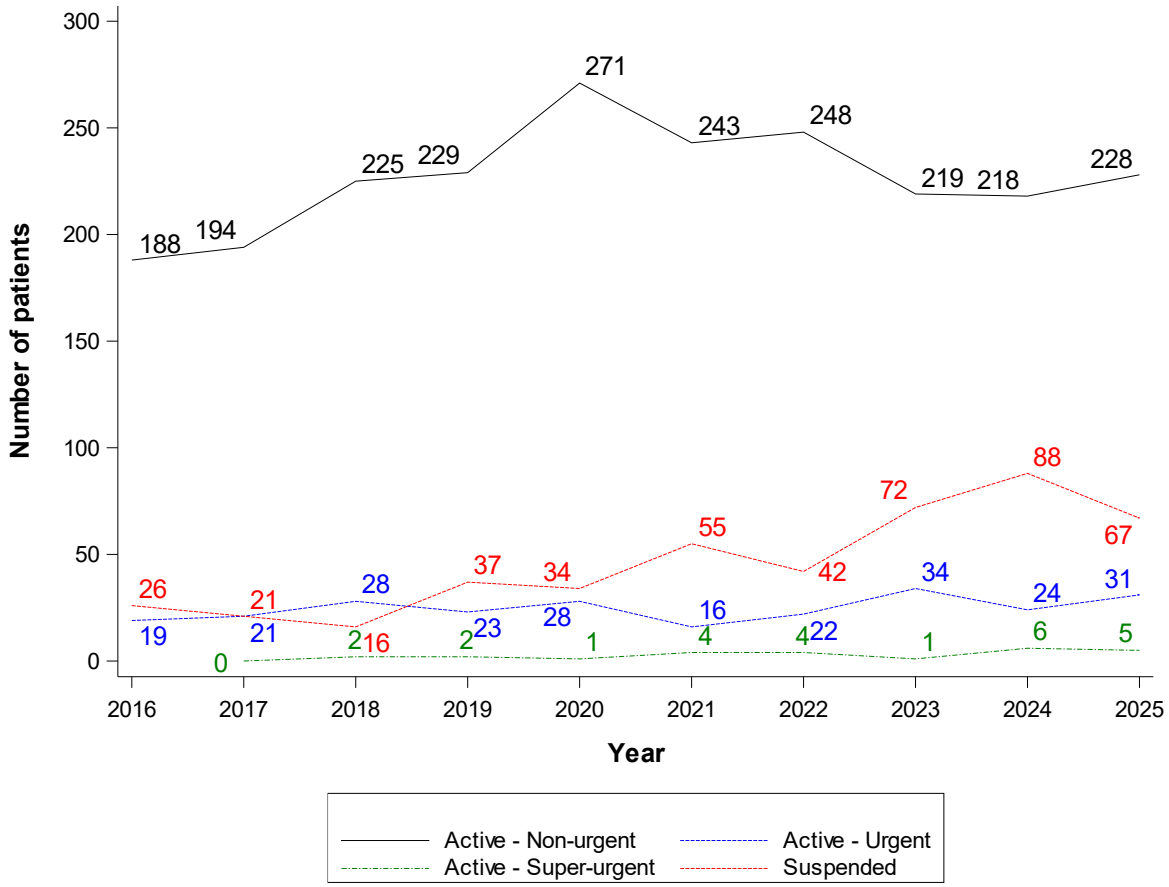


Figure 3.2 shows the number of adults on the active heart transplant list on 31 March 2025, by centre and urgency. **Figure 3.3** provides a similar breakdown by centre and mechanical circulatory support (MCS) status. In total, there were 264 adults waiting for a heart. The number on the urgent transplant list on 31 March 2025 ranged from 2 at Birmingham, Manchester and Papworth to 14 at Newcastle. Papworth had 2 adults on the super-urgent transplant list, while Birmingham, Harefield, and Newcastle each had 1. A total of 118 adult patients were on long-term MCS (including implantable VADs for left, right and biventricular support), representing 45% of the national waiting list, but varying between 9% and 87% across centres.

Figure 3.2 Number of adults on the active heart transplant list on 31 March 2025, by centre and urgency

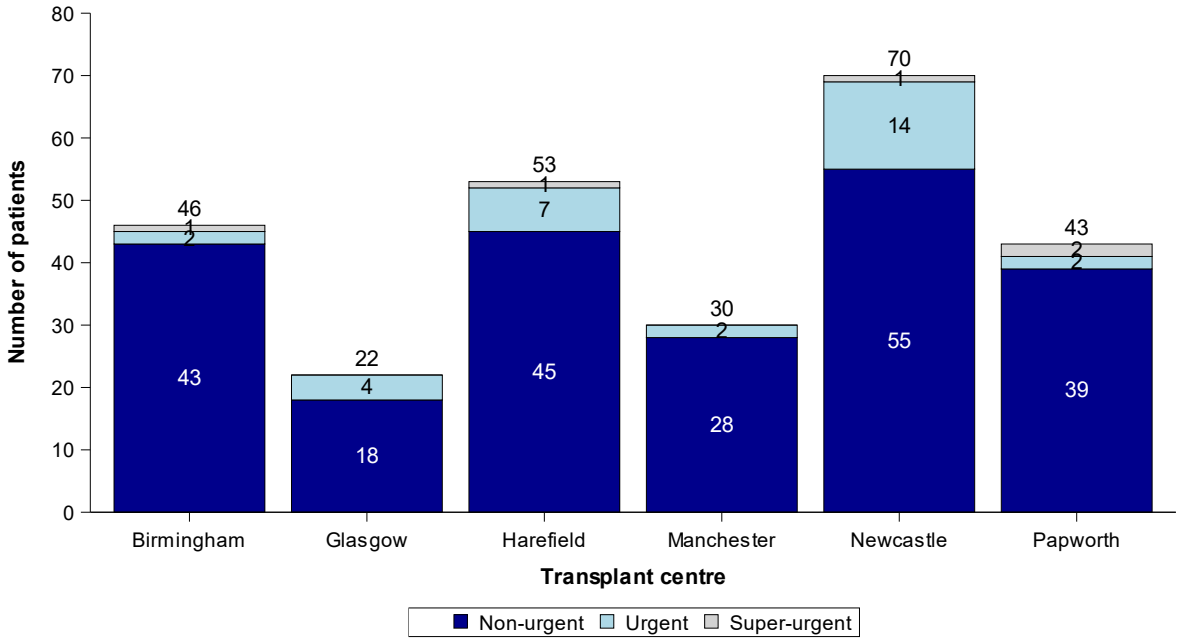


Figure 3.3 Number of adults on the active heart transplant list on 31 March 2025, by centre and mechanical circulatory support status

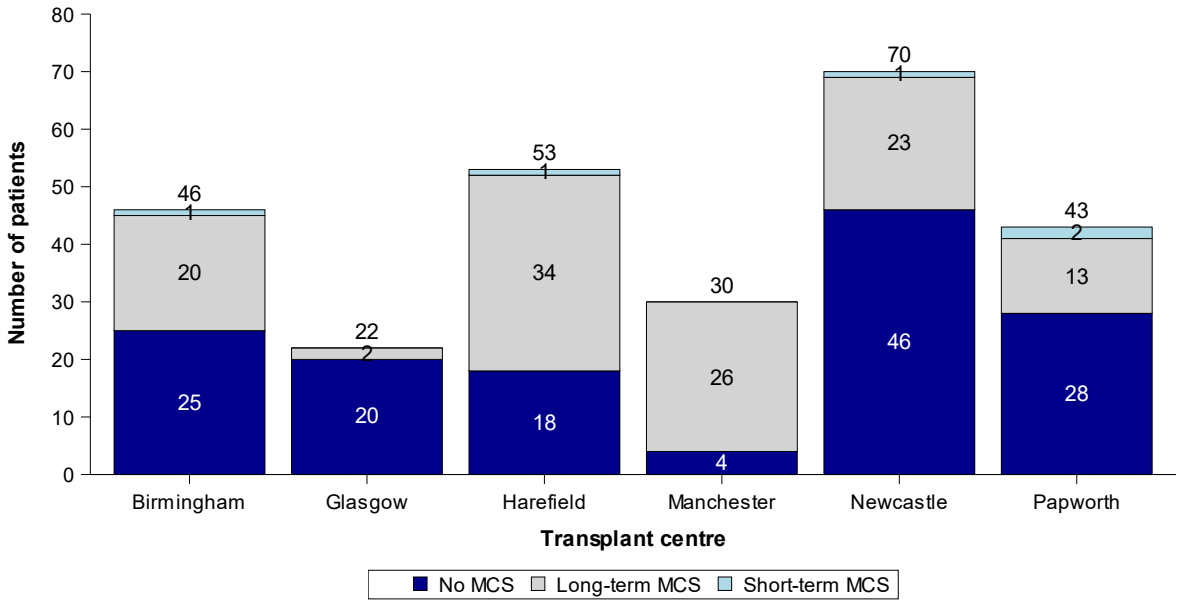
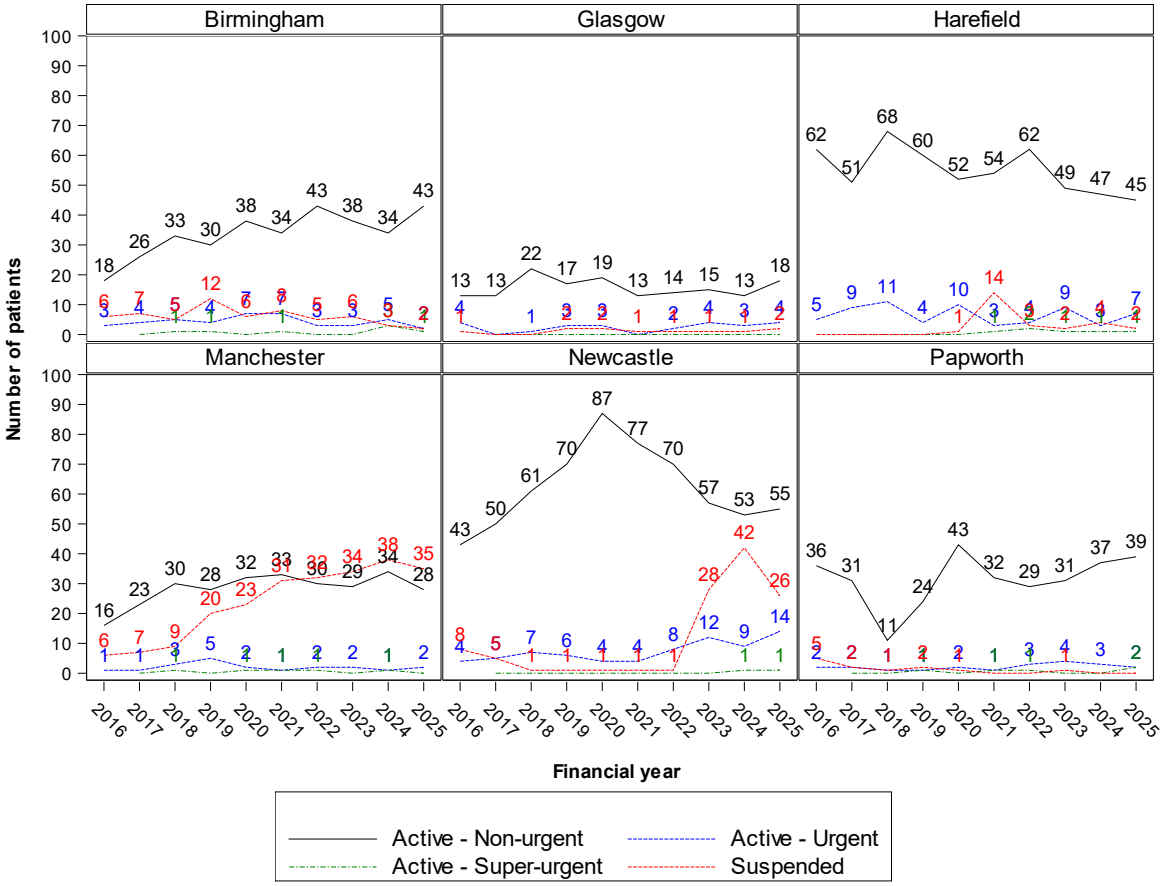


Figure 3.4 shows the trend over time in the number of adults on the heart transplant list on 31 March each year across centres. Birmingham and Papworth have experienced increases in their heart lists over recent years, whilst Harefield and Newcastle have experienced recent decreases. Manchester and Newcastle have both had a noticeable increase in suspended patients in recent years.

Figure 3.4 Number of adults on the heart transplant list on 31 March each year, for the last 10 years, by centre



3.2 Demographic characteristics, 1 April 2024 – 31 March 2025

There were 284 adult registrations onto the heart transplant list between 1 April 2024 and 31 March 2025. Demographic characteristics of these patients are shown by centre and overall, in **Table 3.1**. Nationally, 67% were male and the median age was 52 years. The most common primary disease group was cardiomyopathy. For some characteristics, due to rounding, percentages may not add up to 100.

Table 3.1 Demographic characteristics of adult patient registrations onto the heart transplant list between 1 April 2024 and 31 March 2025, by centre

		Birmingham N (%)	Glasgow N (%)	Harefield N (%)	Manchester N (%)	Newcastle N (%)	Papworth N (%)	**TOTAL N (%)**
Number of registrations		44 (100)	39 (100)	59 (100)	32 (100)	59 (100)	51 (100)	**284 (100)**
Highest urgency during registration	Non-urgent	24 (55)	10 (26)	20 (34)	13 (41)	33 (56)	27 (53)	**127 (45)**
	Urgent	9 (20)	20 (51)	18 (31)	12 (38)	21 (36)	11 (22)	**91 (32)**
	Super-urgent	11 (25)	9 (23)	21 (36)	7 (22)	5 (8)	13 (25)	**66 (23)**
Recipient sex	Male	35 (80)	29 (74)	43 (73)	19 (59)	34 (58)	31 (61)	**191 (67)**
	Female	9 (20)	10 (26)	16 (27)	13 (41)	25 (42)	20 (39)	**93 (33)**
Recipient ethnicity	White	8 (18)	11 (28)	11 (19)	8 (25)	29 (49)	10 (20)	**77 (27)**
	Asian	3 (7)	0 (0)	2 (3)	1 (3)	0 (0)	3 (6)	**9 (3)**
	Black	3 (7)	0 (0)	1 (2)	1 (3)	0 (0)	2 (4)	**7 (3)**
	Missing	30 (68)	28 (72)	45 (76)	22 (69)	30 (51)	36 (71)	**191 (67)**
Recipient age (years)	Median (IQR)	54 (45, 58)	53 (45, 60)	54 (38, 59)	44 (32, 56)	50 (40, 57)	51 (38, 60)	**52 (40, 59)**
	Missing	0	0	0	0	0	0	**0**
Primary Disease	Coronary heart disease	13 (30)	7 (18)	14 (24)	3 (9)	11 (19)	4 (8)	**52 (18)**
	Cardiomyopathy	25 (57)	30 (77)	38 (64)	26 (81)	19 (32)	46 (90)	**184 (65)**
	Congenital heart disease	3 (7)	0 (0)	1 (2)	0 (0)	27 (46)	0 (0)	**31 (11)**
	Graft failure/Rejection	0 (0)	1 (3)	1 (2)	1 (3)	0 (0)	0 (0)	**3 (1)**
	Other/Not reported	3 (7)	1 (3)	5 (8)	2 (6)	2 (3)	1 (2)	**14 (5)**
Previous open heart surgery	None	28 (64)	37 (95)	23 (39)	19 (59)	15 (26)	47 (92)	**169 (60)**
	One	12 (27)	2 (5)	28 (47)	11 (34)	18 (31)	3 (6)	**74 (26)**
	More than one	0 (0)	0 (0)	7 (12)	2 (6)	15 (26)	1 (2)	**25 (9)**
	Missing	4 (9)	0 (0)	1 (2)	0 (0)	10 (17)	0 (0)	**15 (5)**

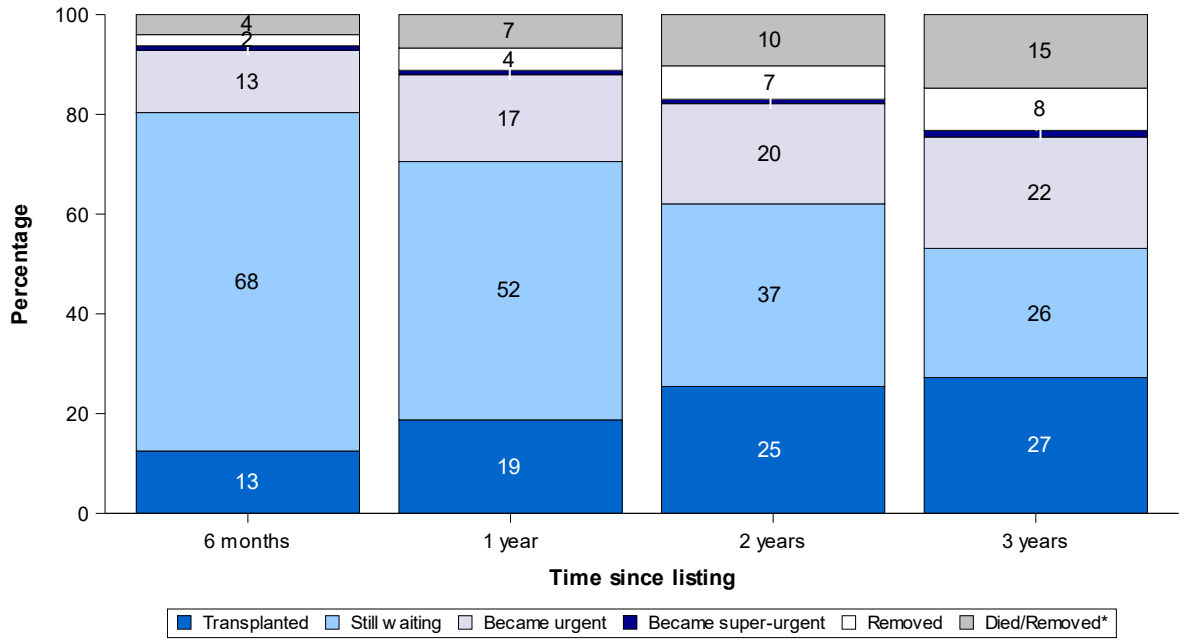
Table 3.1 Demographic characteristics of adult patient registrations onto the heart transplant list between 1 April 2024 and 31 March 2025, by centre								
		Birmingham N (%)	Glasgow N (%)	Harefield N (%)	Manchester N (%)	Newcastle N (%)	Papworth N (%)	**TOTAL N (%)**
Serum bilirubin (umol/l)	Median (IQR)	17 (11, 29)	11 (6, 17)	11 (8, 17)	15 (7, 23)	13 (9, 21)	15 (11, 26)	**14 (9, 22)**
	Missing	4	0	1	1	11	0	**17**
Serum creatinine (umol/l)	Median (IQR)	88 (71, 110)	93 (80, 121)	94 (73, 132)	81 (65, 108)	95 (79, 124)	97 (82, 112)	**93 (75, 118)**
	Missing	4	0	1	1	11	1	**18**

3.3 Post-registration outcomes, 1 April 2020 – 31 March 2022

The registration outcomes of adults listed for a heart transplant between 1 April 2020 and 31 March 2022 are summarised in **Figures 3.5 - 3.9**, nationally and by centre, for non-urgent, urgent and super-urgent registrations respectively. The possible outcomes on the list include receiving a transplant, removal from the list, moving lists, dying on the list, or remaining on the list at a given time point post-registration. Removals from the list due to deteriorating condition are grouped with deaths in this analysis. In these figures, the *first* outcome is considered, so if an individual was transplanted then died their registration outcome would be "transplanted". If they moved lists, e.g. from the non-urgent to the urgent list, they would be included in both the non-urgent and the urgent charts and analysed according to the outcome on each list.

Figure 3.5 shows the non-urgent post-registration outcomes; within 6 months of listing 13% of non-urgent heart registrations resulted in transplant and 4% had died on the list, while after 3 years 27% had been transplanted and 15% had died on the list. Also, 13% had moved to the urgent heart list within 6 months, reaching 22% by 3 years. Removals from the list not due to deteriorating condition were for a variety of reasons, most commonly due to improving condition.

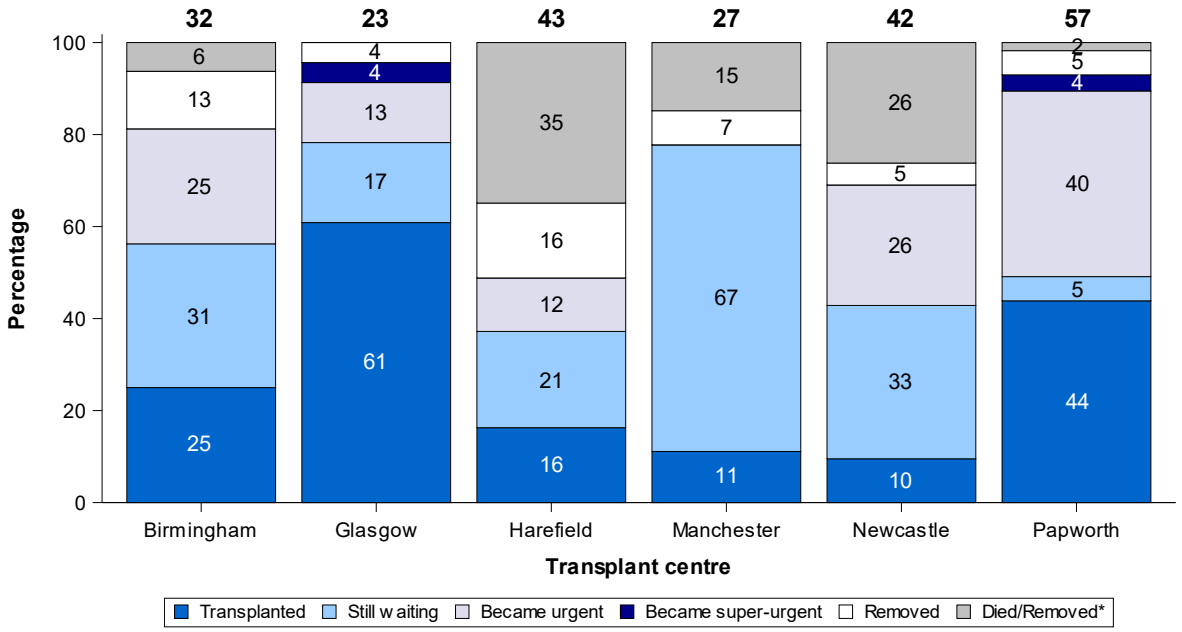
Figure 3.5 Post-registration outcome for 224 non-urgent heart only registrations made in the UK, 1 April 2020 to 31 March 2022



***Removals due to condition deteriorating**

Figure 3.6 shows the 3 year non-urgent registration outcomes by centre. The non-urgent transplant rate at 3 years was highest at Glasgow (61%) and lowest at Newcastle (10%). The mortality rate (including removals due to deteriorating condition) was highest at Harefield (35%) and lowest at Glasgow (0%).

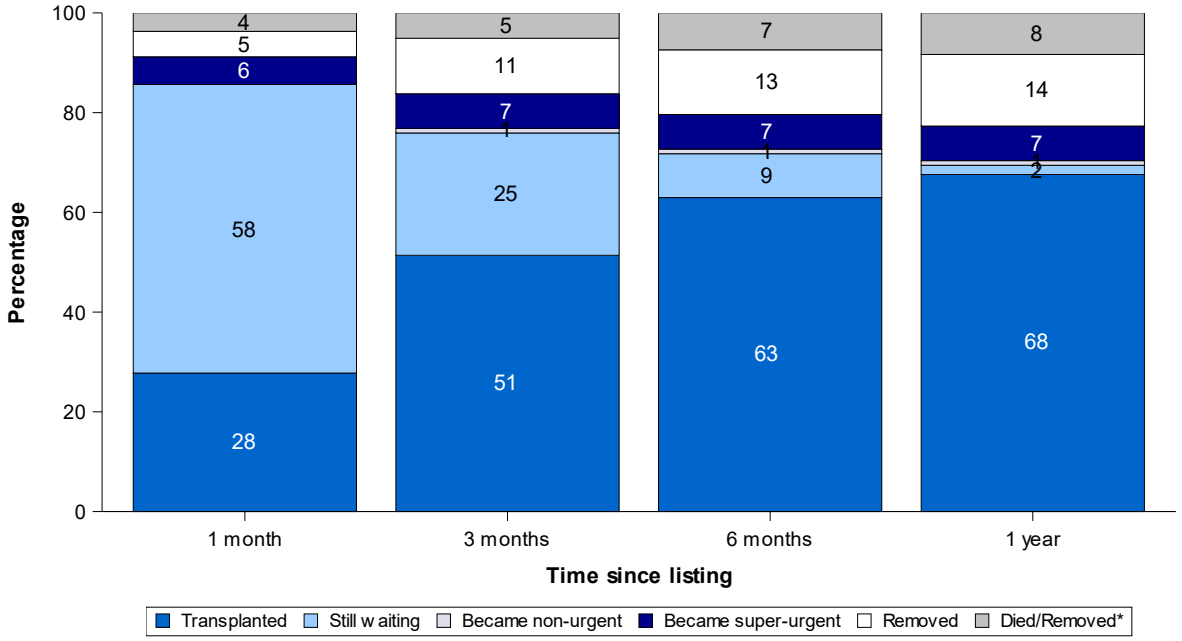
Figure 3.6 3 year post-registration outcomes for 224 non-urgent heart only registrations made in the UK, by centre, 1 April 2020 to 31 March 2022



***Removals due to condition deteriorating**

Figure 3.7 shows outcomes on the urgent heart list. The chance of transplant is considerably higher from the urgent list compared with the non-urgent list; within 6 months, 63% had received a transplant, 7% had died on the list and 13% were removed for other reasons (including the patient receiving an LVAD, improving condition, or contra-indication to transplant).

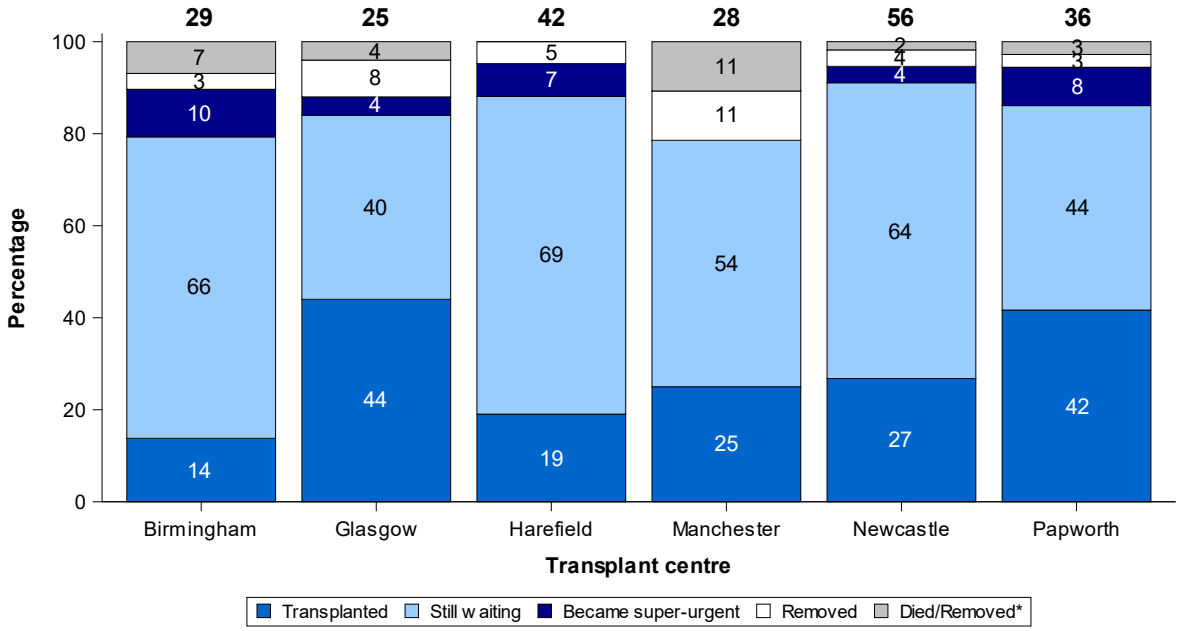
Figure 3.7 Post-registration outcome for 216 urgent heart only registrations made in the UK, 1 April 2020 to 31 March 2022



***Removals due to condition deteriorating**

Figure 3.8 shows the 1 month urgent registration outcomes by centre. The urgent transplant rate at 1 month was highest at Glasgow (44%) and lowest at Birmingham (14%).

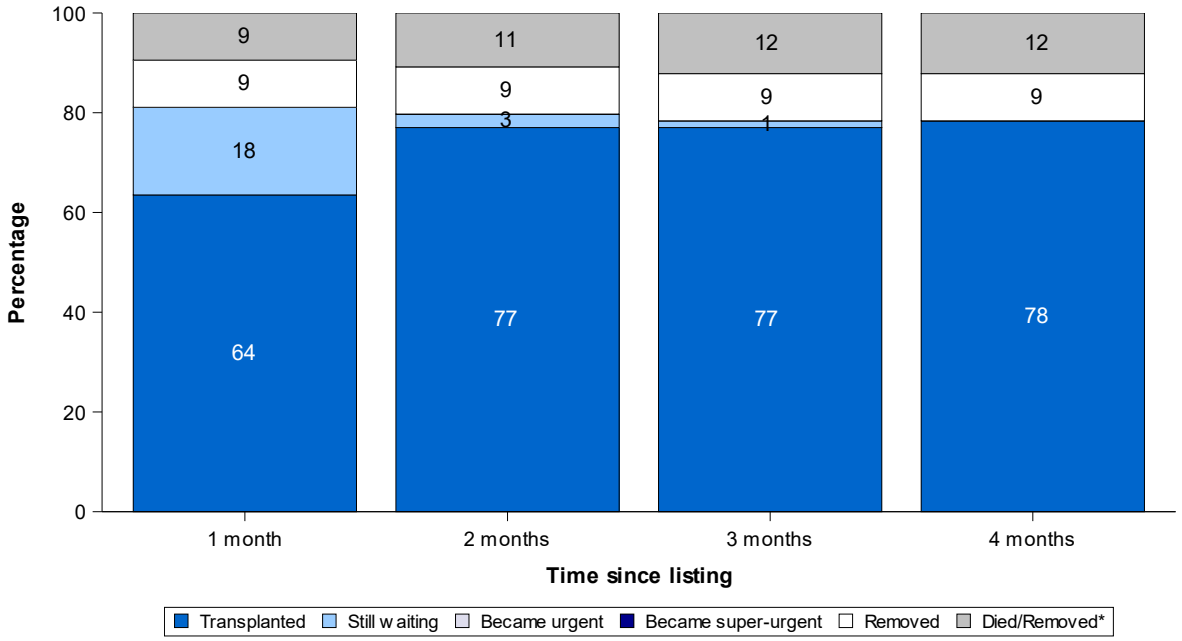
Figure 3.8 1 month post-registration outcomes for 216 urgent heart only registrations made in the UK, by centre, 1 April 2020 to 31 March 2022



***Removals due to condition deteriorating**

Figure 3.9 shows outcomes on the super-urgent list. The chance of transplant is higher from the super-urgent list compared with the non-urgent and urgent lists; within 4 months, 78% had been transplanted, 9% were removed and 12% had died on the list (including removals due to deteriorating condition). There is no break down by centre due to the small numbers.

Figure 3.9 Post-registration outcome for 74 super-urgent heart only registrations made in the UK, 1 April 2020 to 31 March 2022



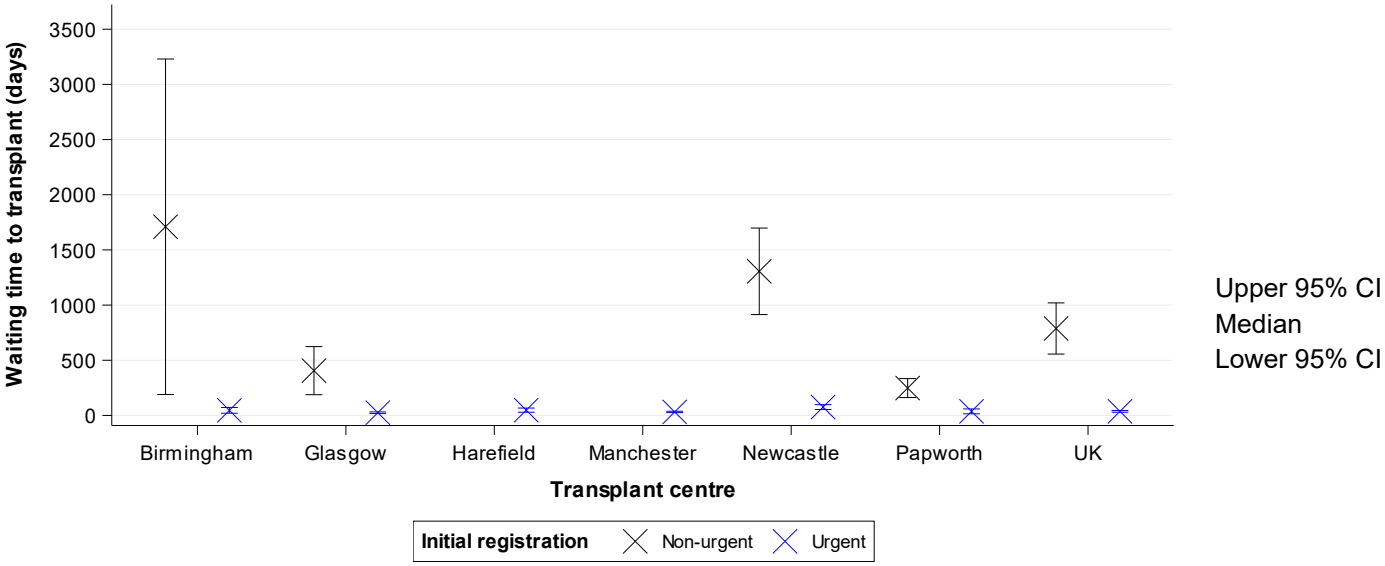
***Removals due to condition deteriorating**

3.4 Median waiting time to transplant, 1 April 2018 - 31 March 2024

The median waiting time to heart transplant from registration for adults is shown in **Figure 3.10** and **Table 3.2**. This is estimated using the Kaplan Meier method, to allow for censoring, for non-urgent registrations onto the heart only transplant list between 1 April 2018 and 31 March 2021 and urgent and super-urgent registrations between 1 April 2021 and 31 March 2024. The urgency groups are defined by urgency at initial registration and all waiting time from initial registration is considered, regardless of any change in urgency. Any suspended time is discounted.

The overall national median waiting time to transplant from non-urgent registration was 788 days (2.2 years) and ranged from 248 days at Papworth to 1710 days at Birmingham but could not be calculated for Harefield and Manchester due to a low transplant rate from the non-urgent list. For urgent registrations, the national median waiting time was 37 days and ranged from 25 days at Glasgow to 76 days at Newcastle. The national median waiting time for super-urgent registrations was 15 days. The 95% confidence intervals for some of these medians are very wide, indicating the imprecision of some of the estimates.

Figure 3.10 Median active waiting time to heart transplant for adults registered on the non-urgent transplant list (1 April 2018 to 31 March 2021) or urgent transplant list (1 April 2021 to 31 March 2024), by centre and urgency status at registration



Note: Median waiting times could not be estimated for non-urgent registrations at Harefield and Manchester due to low transplant rate

Table 3.2 Median active waiting time to heart transplant for adult patients registered on the non-urgent transplant list (1 April 2018 to 31 March 2021) or urgent/super-urgent transplant list (1 April 2021 to 31 March 2024), by centre

Transplant centre	Number of patients registered	Number transplanted	Waiting time (days) Median	Waiting time (days) 95% Confidence interval
Non-urgent at initial registration				
Birmingham	53	22	1710	190 - 3230
Glasgow	26	20	406	188 - 624
Harefield[1]	61	20	-	-
Manchester[1]	60	17	-	-
Newcastle	88	37	1306	914 - 1698
Papworth	117	89	248	162 - 334
UK	**405**	**205**	**788**	**556 - 1020**
Urgent at initial registration				
Birmingham	47	38	46	20 - 72
Glasgow	55	51	25	18 - 32
Harefield	69	56	48	29 - 67
Manchester	33	21	32	26 - 38
Newcastle	57	41	76	54 - 98
Papworth	17	13	37	15 - 59
UK	**278**	**220**	**37**	**29 - 45**
Super-urgent at initial registration				
Birmingham	12	11	36	28 - 44
Glasgow	17	16	5	2 - 8
Harefield	27	21	12	4 - 20
Manchester	18	13	16	11 - 21
Newcastle	12	8	13	5 - 21
Papworth	27	22	18	8 - 28
UK	**113**	**91**	**15**	**11 - 19**

[1] Medians and 95% confidence intervals could not be calculated due to low transplant rate

The median waiting time to heart transplant for adults is also considered by blood group. This is shown in **Figure 3.11** and **Table 3.3** by both blood group and urgency status at registration. Blood group O has the longest average wait across non-urgent, urgent, and super-urgent registrations.

Figure 3.11 Median active waiting time to heart transplant for adults registered on the non-urgent transplant list (1 April 2018 to 31 March 2021) or urgent transplant list (1 April 2021 to 31 March 2024), by blood group and urgency status at registration

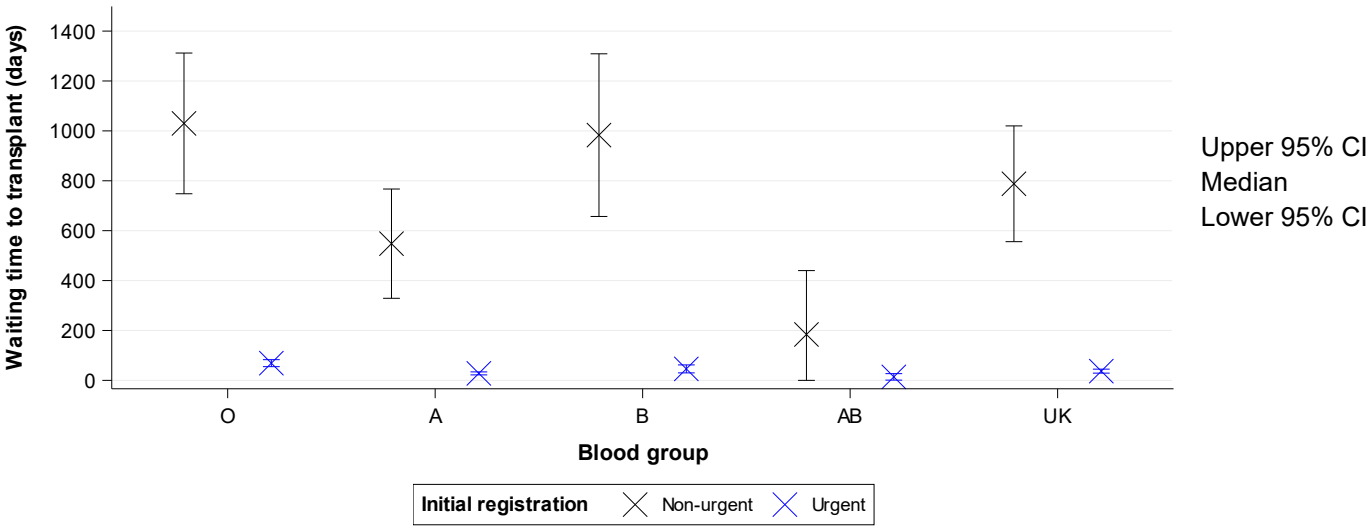


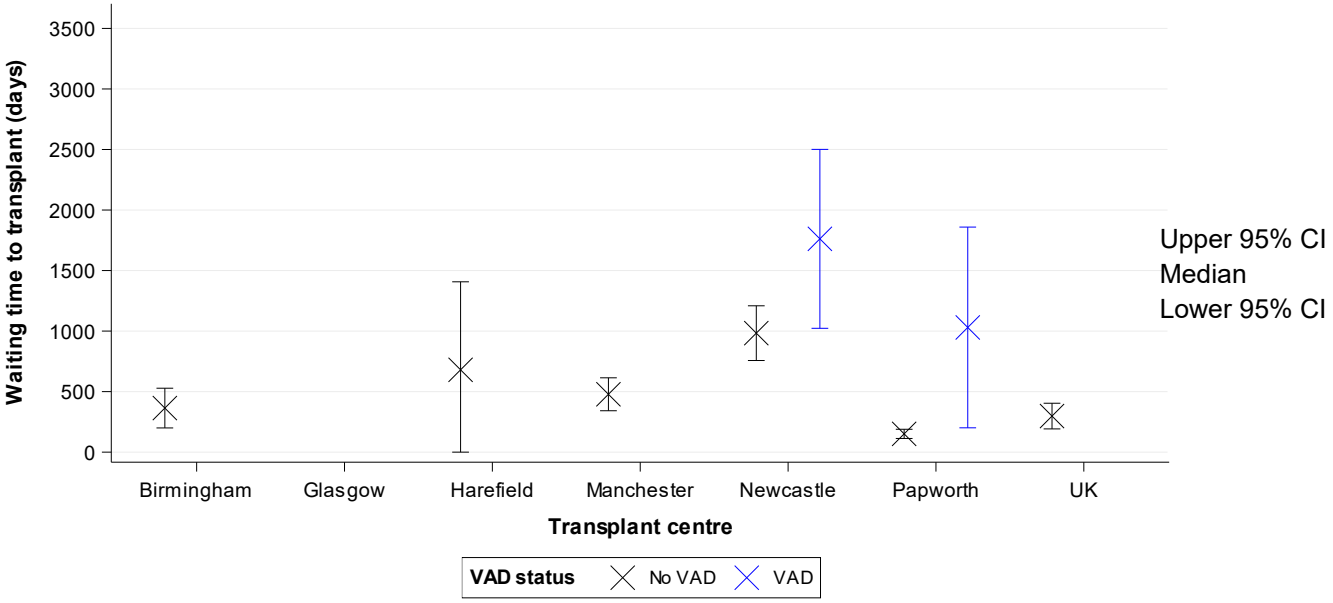
Table 3.3 Median active waiting time to heart transplant for adult patients registered on the non-urgent transplant list (1 April 2018 to 31 March 2021) or urgent/super-urgent transplant list (1 April 2021 to 31 March 2024), by blood group

Blood Group	Number of patients registered	Number transplanted	Waiting time (days) Median	95% Confidence interval
Non-urgent at initial registration				
O	181	83	1030	748 - 1312
A	168	92	548	329 - 767
B	40	18	983	657 - 1309
AB	16	12	184	0 - 440
UK	**405**	**205**	**788**	**556 - 1020**
Urgent at initial registration				
O	105	77	69	55 - 83
A	122	99	28	22 - 34
B	40	35	46	30 - 62
AB	11	9	14	1 - 27
UK	**278**	**220**	**37**	**29 - 45**
Super-urgent at initial registration				
O	51	35	21	10 - 32
A	51	48	10	3 - 17
B	10	8	13	4 - 22
AB[1]	1	-	-	-
UK	**113**	**91**	**15**	**11 - 19**

[1] Median waiting time for groups with less than 10 are not presented due to small numbers

The median waiting time to heart transplant for adults is shown by VAD status in **Figure 3.12** and **Table 3.4**. This considers whether a patient ever had an implantable left-ventricular assist device (LVAD) as a bridge to heart transplant compared with not and is restricted to those who were initially non-urgent. Median waiting time for those on LVAD support could not be estimated for most centres, nor on a national basis, as not enough patients had been transplanted in this group at time of analysis. However, the national median for those not on LVAD support (298 days) was substantially lower than the overall median for non-urgent patients (788 days).

Figure 3.12 Median active waiting time to heart transplant for adults registered on the non-urgent transplant list between 1 April 2018 and 31 March 2021, by centre and VAD status



Note: Median waiting times for those on LVAD support could only be estimated for Newcastle and Papworth. Glasgow is not included in the display due to a small numbers.

Table 3.4 Median active waiting time to heart transplant for adult patients registered on the non-urgent transplant list, by centre and whether the patient had an implantable left-ventricular assist device (LVAD), 1 April 2018 to 31 March 2021

Transplant centre	Number of patients registered	Number transplanted	Waiting time (days) Median	Waiting time (days) 95% Confidence interval
Never on LVAD support				
Birmingham	29	20	364	200 - 528
Glasgow	23	18	406	180 - 632
Harefield	24	13	680	0 - 1407
Manchester	15	12	478	342 - 614
Newcastle	46	26	983	757 - 1209
Papworth	87	70	151	113 - 189
UK	**224**	**159**	**298**	**192 - 404**
Ever on LVAD support				
Birmingham[1]	24	2	-	-
Glasgow[2]	3	2	-	-
Harefield[1]	37	7	-	-
Manchester[1]	45	5	-	-
Newcastle	42	11	1762	1023 - 2501
Papworth	30	19	1030	201 - 1859
UK[1]	**181**	**46**	**-**	**-**

[1] Medians and 95% confidence intervals could not be calculated due to low transplant rate
[2] Median waiting time for groups with less than 10 are not presented due to small numbers

ADULT HEART TRANSPLANTATION

Response to Offers

4. Response to Offers

This section presents an analysis of adult DBD donor heart offer decline rates. This only considers offers of hearts between 1 April 2022 and 31 March 2025 that were eventually transplanted and excludes all fast track offers. Hearts offered as part of a heart-lung block are included. Super-urgent, urgent and non-urgent offers are all considered. Offers to paediatric patients at Newcastle are excluded.

In 2017, group offering for non-urgent cardiothoracic organ offers was introduced, where all centres receive a simultaneous offer for their non-urgent patients but acceptance is determined by a centre's position in the allocation sequence. In this analysis, adjustments have been made to count any centre who is ranked above the accepting centre in the allocation sequence for that donor as declining the heart, even if they did not respond to the group offer, and any declines recorded for a centre ranked below the accepting centre were discounted.

Figure 4.1 compares individual centre decline rates with the national rate using a funnel plot. The offer decline rate for Newcastle is above the upper 99.8% confidence limit, indicating a significantly higher decline rate than the national rate, however this may be due to a small number of hard to match patients receiving multiple offers, and no adjustment has been made for this. The offer decline rate for Papworth falls below the 99.8% lower confidence limit, indicating a significantly low decline rate at this centre. There is also some evidence of a low decline rate at Glasgow as their rate falls below the 95% lower confidence limit. The offer decline rates for Birmingham, Harefield and Manchester are consistent with the national rate.

Figure 4.1 UK adult DBD donor heart offer decline rates by centre, 1 April 2022 to 31 March 2025

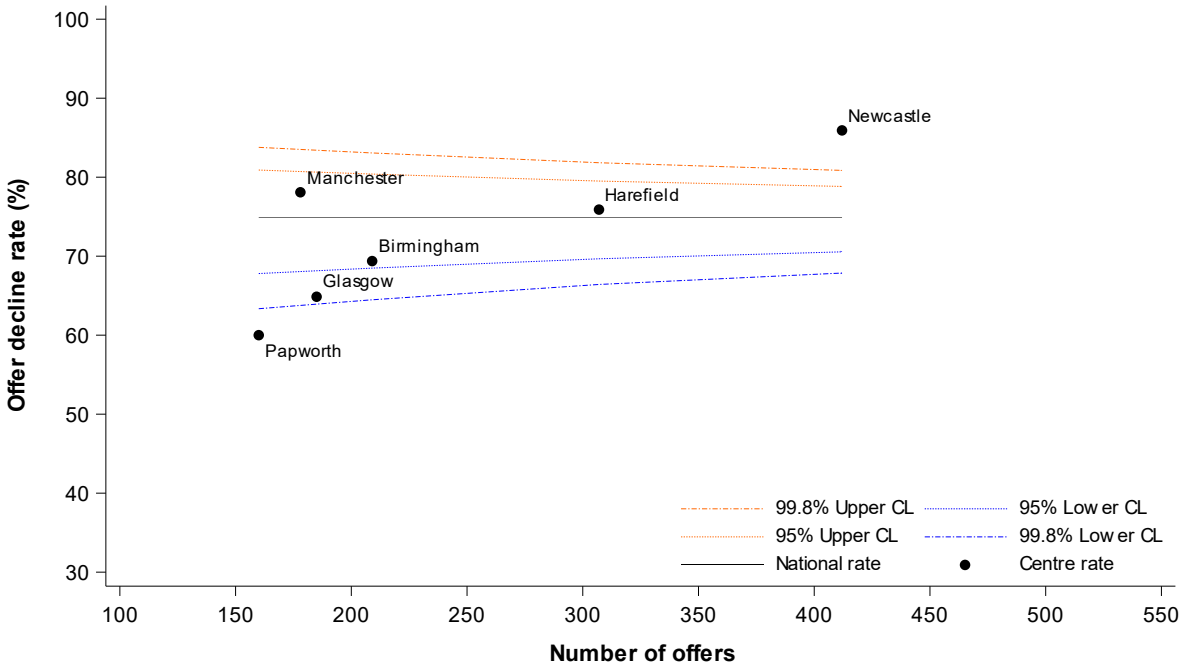


Table 4.1 shows a breakdown of each centre's decline rate across the three years analysed. Nationally, the highest number of offers (for hearts that were eventually transplanted) occurred in the financial year 2023/24, although the offer decline rate was also highest in this year.

Table 4.1 Adult Heart (including cardiac block) offer results by transplant centre, between 1 April 2022 and 31 March 2025

Centre	2022/23		2023/24		2024/25		Overall	
	No. offers	Decline rate (%)	No. offers	Decline rate (%)	No. offers	Decline rate (%)	No. offers	Decline rate (%)
Birmingham	59	64.4	91	72.5	59	69.5	209	69.4
Glasgow	59	54.2	66	71.2	60	68.3	185	64.9
Harefield	87	77.0	122	75.4	98	75.5	307	75.9
Manchester	39	74.4	84	83.3	55	72.7	178	78.1
Newcastle	137	85.4	186	88.7	89	80.9	412	85.9
Papworth	53	58.5	62	62.9	45	57.8	160	60.0
UK	**434**	**72.4**	**611**	**78.4**	**406**	**72.4**	**1451**	**74.9**

Centre has reached the upper 99.8% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the lower 99.8% confidence limit

ADULT HEART TRANSPLANTATION

Transplants

5.1 Adult heart transplants, 1 April 2015 – 31 March 2025

Figure 5.1 shows the number of adult heart transplants performed per year over the last 10 years, by donor type. Last year there were 174 adult heart transplants nationally, 25 fewer than the previous year, with DCD heart transplants comprising 28%.

Figure 5.1 Number of adult heart transplants in the UK, by financial year and donor type, 1 April 2015 to 31 March 2025

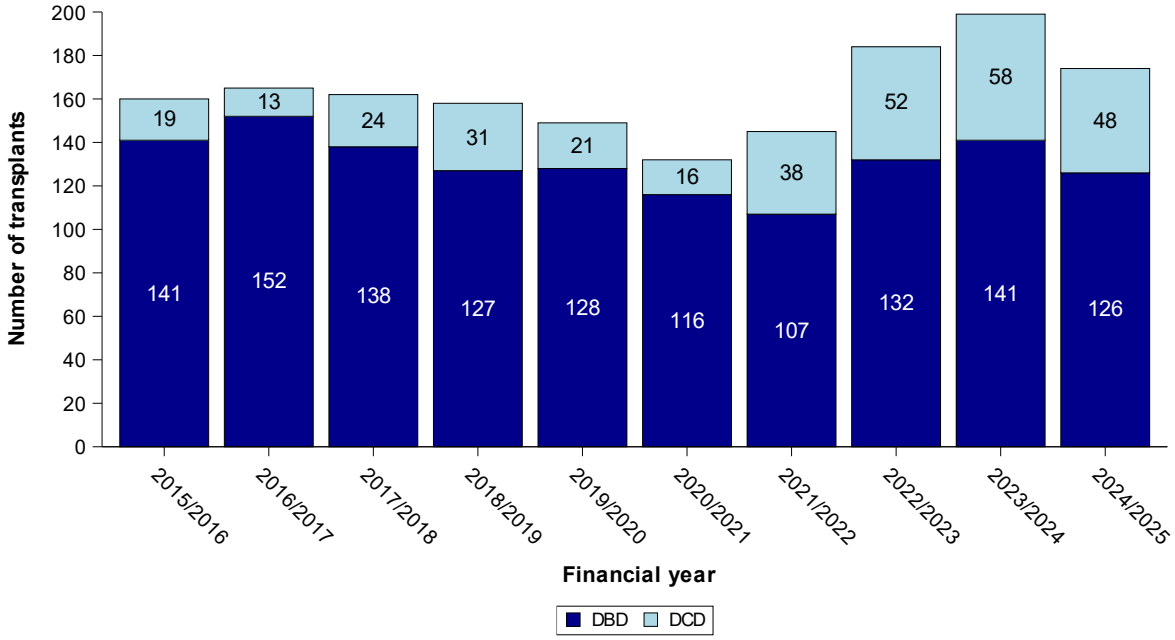
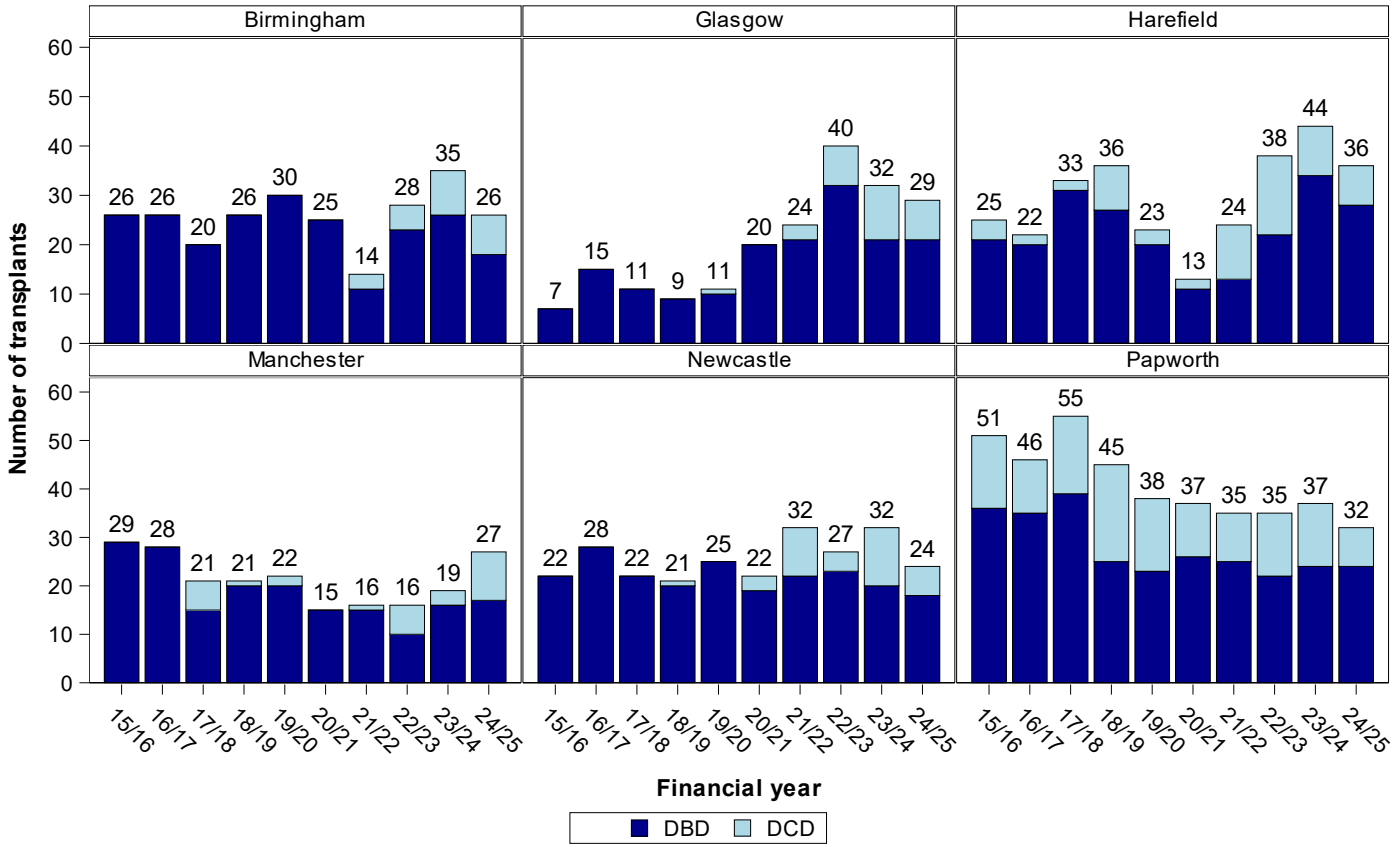


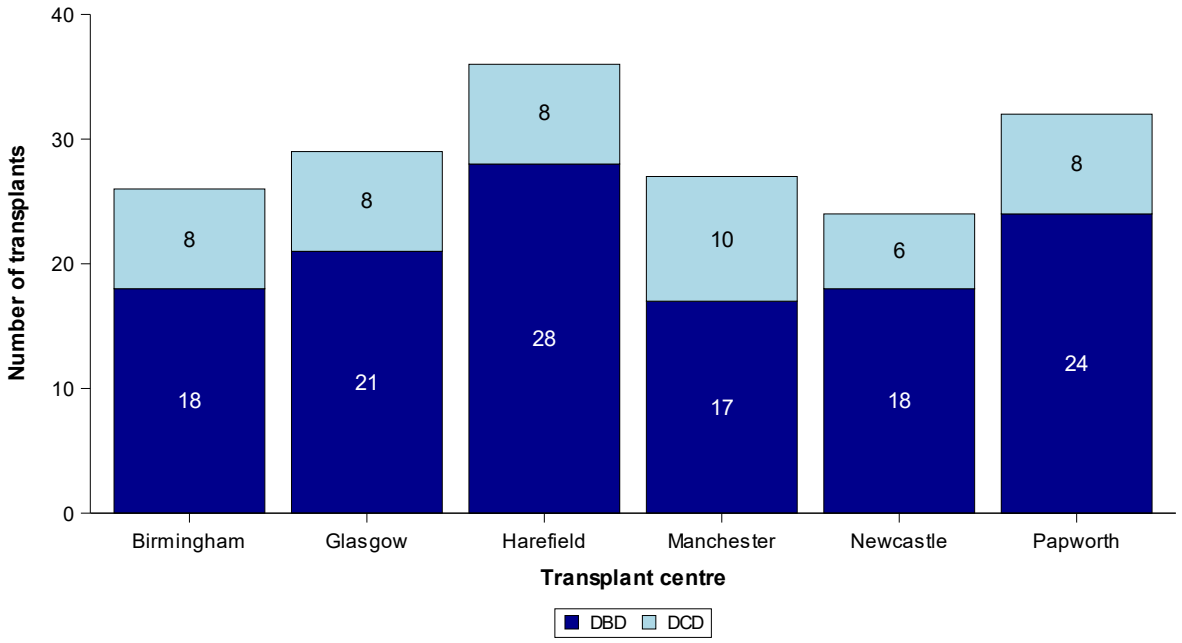
Figure 5.2 shows the number of adult heart transplants performed per centre, per year, over the last 10 years, by donor type There was a decrease across all centres, in the number of transplants performed in 2024/2025 compared with 2023/2024, except for Manchester who performed more.

Figure 5.2 Number of adult heart transplants in the UK, by financial year, centre and donor type, 1 April 2015 to 31 March 2025



Last year's activity is shown by centre and donor type in **Figure 5.3**. The highest number of DBD heart transplants were performed by Harefield and the highest number of DCD transplants were performed by Manchester.

Figure 5.3 Number of adult heart transplants in the UK, by centre and donor type, 1 April 2024 to 31 March 2025



Figures 5.4 and **5.5** show the number of adult heart transplants performed in the last 10 years, by urgency status of recipient, nationally and by centre, respectively. Over the decade, the proportion of non-urgent transplants has remained similar, at 21% in both 2015/2016 and 2024/2025. Meanwhile the proportion of super-urgent transplants has increased from 9% in 2016/2017 (the year the scheme was introduced) to 33% in 2024/2025.

Figure 5.4 Number of adult heart transplants in the UK, by financial year and urgency status, 1 April 2015 to 31 March 2025

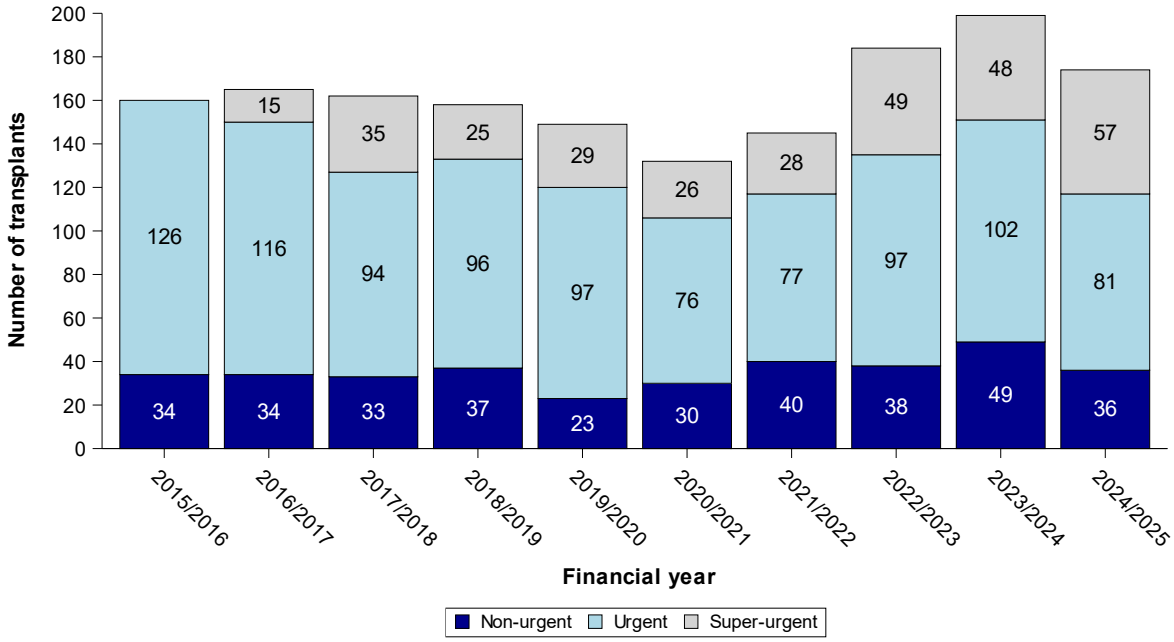
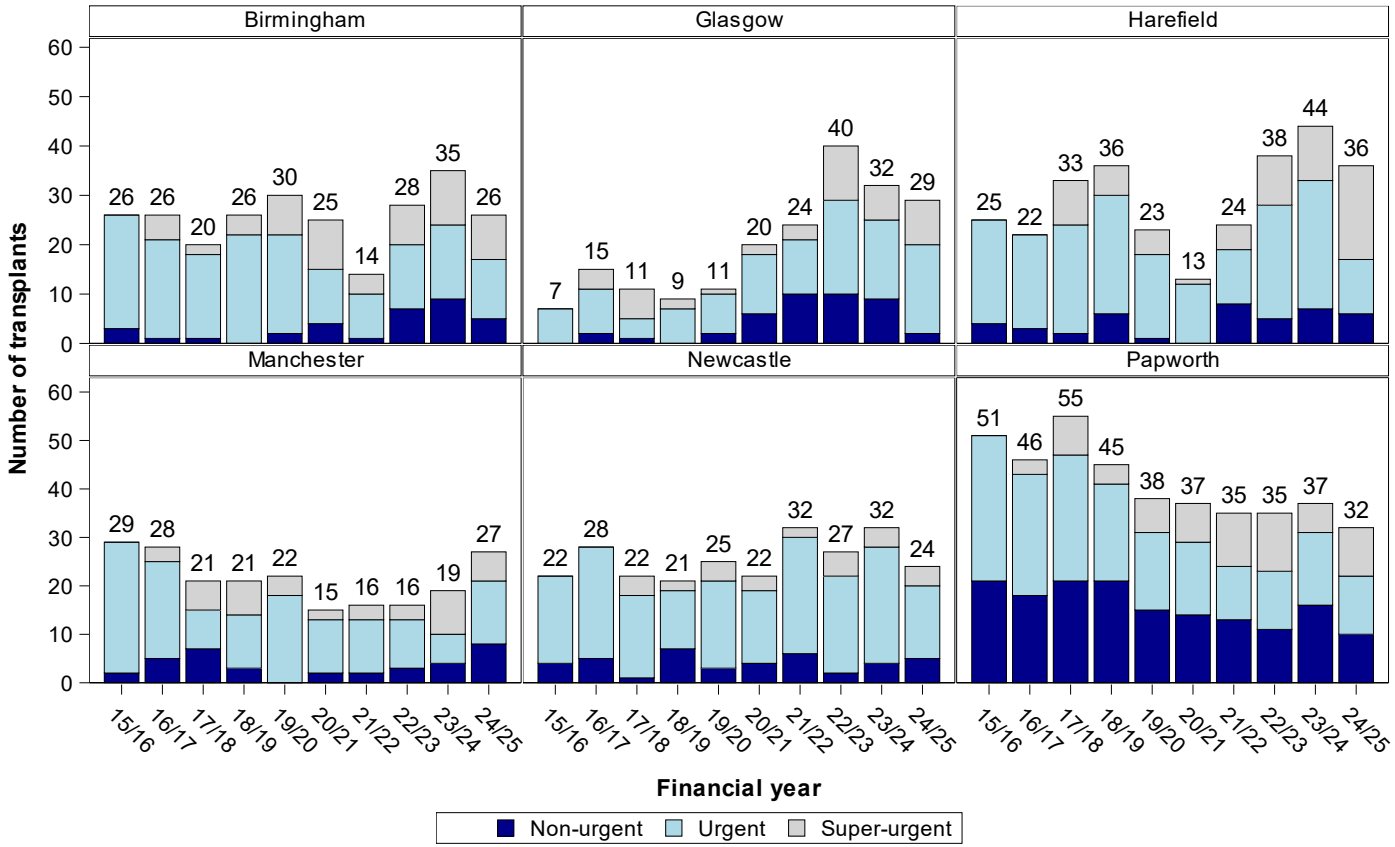
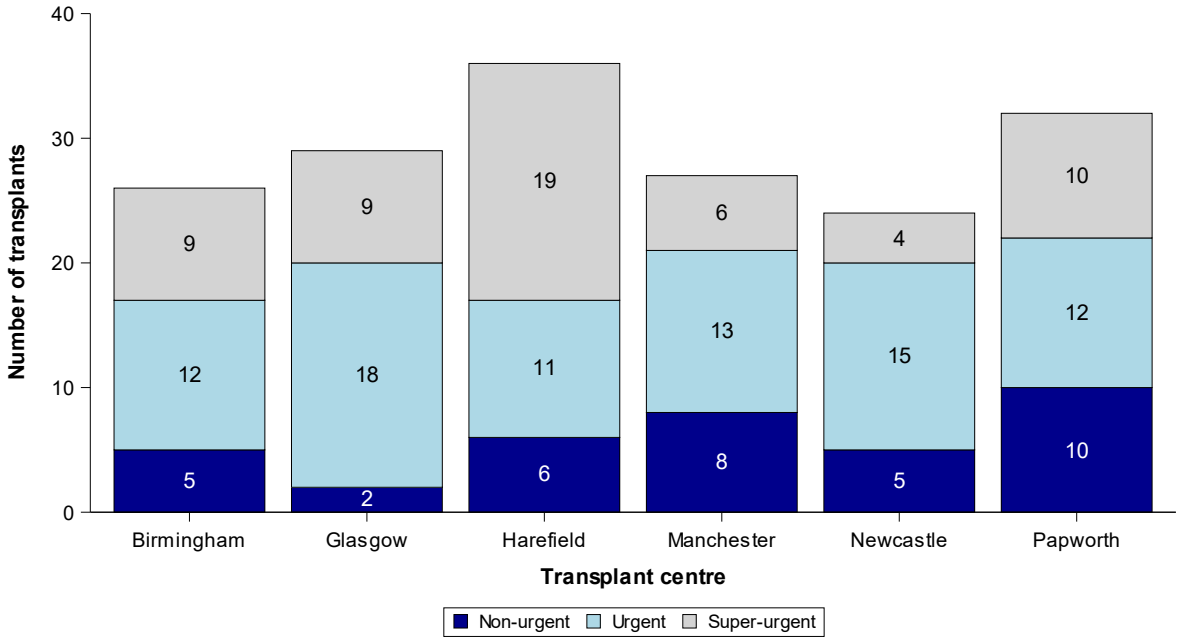


Figure 5.5 Number of adult heart transplants in the UK, by financial year centre and urgency status, 1 April 2015 to 31 March 2025



Last year's activity is shown by centre and urgency status in **Figure 5.6**. Harefield performed the highest number of super-urgent transplants.

Figure 5.6 Number of adult heart transplants in the UK, by centre and urgency status, 1 April 2024 to 31 March 2025



5.2 Demographic characteristics of transplants, 1 April 2024 – 31 March 2025

The demographic characteristics of the 174 adult heart transplant recipients and donors in the latest year are shown by centre and overall, in **Table 5.1**. Nationally, 71% of heart recipients were male and the median age was 49 years while the median age of donors was 38 years. For some characteristics, due to rounding, percentages may not add up to 100.

Table 5.1 Demographic characteristics of UK adult heart transplants performed between 1 April 2024 and 31 March 2025, by centre

		Birmingham N (%)	Glasgow N (%)	Harefield N (%)	Manchester N (%)	Newcastle N (%)	Papworth N (%)	**TOTAL N (%)**
Number of transplants		26 (100)	29 (100)	36 (100)	27 (100)	24 (100)	32 (100)	**174 (100)**
Urgency status at transplant	Non-urgent	5 (19)	2 (7)	6 (17)	8 (30)	5 (21)	10 (31)	**36 (21)**
	Urgent	12 (46)	18 (62)	11 (31)	13 (48)	15 (63)	12 (38)	**81 (47)**
	Super-urgent	9 (35)	9 (31)	19 (53)	6 (22)	4 (17)	10 (31)	**57 (33)**
Recipient sex	Male	23 (88)	24 (83)	27 (75)	15 (56)	14 (58)	20 (63)	**123 (71)**
	Female	3 (12)	5 (17)	9 (25)	12 (44)	10 (42)	12 (38)	**51 (29)**
Recipient ethnicity	White	16 (62)	26 (90)	24 (67)	21 (78)	22 (92)	25 (78)	**134 (77)**
	Asian	6 (23)	2 (7)	7 (19)	5 (19)	1 (4)	3 (9)	**24 (14)**
	Black	2 (8)	0 (0)	2 (6)	1 (4)	1 (4)	1 (3)	**7 (4)**
	Other	2 (8)	0 (0)	2 (6)	0 (0)	0 (0)	2 (6)	**6 (3)**
	Missing	0 (0)	1 (3)	1 (3)	0 (0)	0 (0)	1 (3)	**3 (2)**
Recipient age (years)	Median (IQR)	51 (43, 57)	55 (43, 60)	53 (35, 58)	42 (33, 53)	44 (39, 53)	49 (28, 59)	**49 (36, 57)**
	Missing	0	0	0	0	0	0	**0**
Recipient weight (kg)	Median (IQR)	74 (68, 90)	75 (67, 93)	76 (68, 86)	75 (70, 83)	73 (65, 89)	71 (65, 87)	**74 (66, 88)**
	Missing	0	0	0	0	0	0	**0**

Table 5.1 Demographic characteristics of UK adult heart transplants performed between 1 April 2024 and 31 March 2025, by centre

		Birmingham N (%)	Glasgow N (%)	Harefield N (%)	Manchester N (%)	Newcastle N (%)	Papworth N (%)	**TOTAL N (%)**
Recipient primary disease	Coronary heart disease	3 (12)	6 (21)	7 (19)	2 (7)	2 (8)	3 (9)	**23 (13)**
	Cardiomyopathy	20 (77)	22 (76)	24 (67)	23 (85)	7 (29)	28 (88)	**124 (71)**
	Congenital heart disease	0 (0)	0 (0)	0 (0)	1 (4)	15 (63)	0 (0)	**16 (9)**
	Graft failure/Rejection	0 (0)	0 (0)	1 (3)	1 (4)	0 (0)	0 (0)	**2 (1)**
	Other	3 (12)	1 (3)	4 (11)	0 (0)	0 (0)	1 (3)	**9 (5)**
NYHA class	II	0 (0)	0 (0)	1 (3)	0 (0)	1 (4)	4 (13)	**6 (3)**
	III	5 (19)	9 (31)	9 (25)	0 (0)	13 (54)	11 (34)	**47 (27)**
	IV	19 (73)	19 (66)	20 (56)	10 (37)	10 (42)	17 (53)	**95 (55)**
	Missing	2 (8)	1 (3)	6 (17)	17 (63)	0 (0)	0 (0)	**26 (15)**
Recipient in hospital	No	6 (23)	2 (7)	6 (17)	8 (30)	7 (29)	10 (31)	**39 (22)**
	Yes	20 (77)	26 (90)	30 (83)	19 (70)	17 (71)	22 (69)	**134 (77)**
	Missing	0 (0)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)	**1 (1)**
In hospital, recipient on ventilator	No	18 (90)	26 (100)	30 (100)	18 (95)	17 (100)	22 (100)	**131 (98)**
	Yes	1 (5)	0 (0)	0 (0)	1 (5)	0 (0)	0 (0)	**2 (2)**
	Missing	1 (5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	**1 (1)**
In hospital, recipient VAD	None	11 (55)	21 (81)	11 (37)	12 (63)	13 (76)	14 (64)	**82 (61)**
	Left	0 (0)	3 (12)	3 (10)	1 (5)	2 (12)	0 (0)	**9 (7)**
	Right	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	**0 (0)**
	Both	9 (45)	2 (8)	16 (53)	6 (32)	2 (12)	8 (36)	**43 (32)**
In hospital, recipient TAH	No	20 (100)	26 (100)	30 (100)	19 (100)	17 (100)	22 (100)	**134 (100)**
In hospital, recipient ECMO	No	20 (100)	22 (85)	28 (93)	19 (100)	16 (94)	22 (100)	**127 (95)**
	Yes	0 (0)	4 (15)	2 (7)	0 (0)	1 (6)	0 (0)	**7 (5)**

Table 5.1 Demographic characteristics of UK adult heart transplants performed between 1 April 2024 and 31 March 2025, by centre

		Birmingham N (%)	Glasgow N (%)	Harefield N (%)	Manchester N (%)	Newcastle N (%)	Papworth N (%)	**TOTAL N (%)**
In hospital, recipient on inotropes	No	7 (35)	3 (12)	12 (40)	7 (37)	3 (18)	10 (45)	**42 (31)**
	Yes	13 (65)	23 (88)	18 (60)	12 (63)	14 (82)	12 (55)	**92 (69)**
In hospital, recipient IABP	No	20 (100)	17 (65)	30 (100)	17 (89)	17 (100)	21 (95)	**122 (91))**
	Yes	0 (0)	9 (35)	0 (0)	2 (11)	0 (0)	1 (5)	**12 (9)**
Recipient CMV status	Negative	12 (46)	14 (48)	13 (36)	17 (63)	14 (58)	17 (53)	**87 (50)**
	Positive	14 (54)	15 (52)	23 (64)	10 (37)	10 (42)	15 (47)	**87 (50)**
Recipient HCV status	Negative	26 (100)	28 (97)	36 (100)	27 (100)	24 (100)	32 (100)	**173 (99)**
	Missing	0 (0)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)	**1 (1)**
Recipient HBV status	Negative	25 (96)	28 (97)	35 (97)	27 (100)	23 (96)	32 (100)	**170 (98)**
	Positive	1 (4)	0 (0)	1 (3)	0 (0)	1 (4)	0 (0)	**3 (2)**
	Missing	0 (0)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)	**1 (1)**
Recipient HIV status	Negative	26 (100)	27 (93)	36 (100)	27 (100)	24 (100)	32 (100)	**172 (99)**
	Positive	0 (0)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)	**1 (1)**
	Missing	0 (0)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)	**1 (1)**
Recipient serum creatinine (umol/l)	Median (IQR)	87 (68, 120)	97 (71, 121)	86 (70, 110)	76 (58, 99)	107 (81, 132)	94 (69, 111)	**87 (69, 117)**
	Missing	0	4	1	0	0	0	**5**
Donor sex	Male	20 (77)	23 (79)	27 (75)	16 (59)	17 (71)	22 (69)	**125 (72)**
	Female	6 (23)	6 (21)	9 (25)	11 (41)	7 (29)	10 (31)	**49 (28)**
Donor ethnicity	White	23 (88)	26 (90)	30 (83)	25 (93)	22 (92)	28 (88)	**154 (89)**
	Asian	1 (4)	1 (3)	2 (6)	1 (4)	1 (4)	0 (0)	**6 (3)**
	Black	0 (0)	1 (3)	1 (3)	1 (4)	0 (0)	2 (6)	**5 (3)**
	Other	1 (4)	0 (0)	1 (3)	0 (0)	0 (0)	1 (3)	**3 (2)**
	Missing	1 (4)	1 (3)	2 (6)	0 (0)	1 (4)	1 (3)	**6 (3)**
Donor age (years)	Median (IQR)	36 (29, 49)	40 (28, 44)	40 (32, 52)	38 (26, 42)	36 (26, 40)	41 (29, 46)	**38 (29, 46)**
	Missing	0	0	0	0	0	0	**0**

Table 5.1 Demographic characteristics of UK adult heart transplants performed between 1 April 2024 and 31 March 2025, by centre

		Birmingham N (%)	Glasgow N (%)	Harefield N (%)	Manchester N (%)	Newcastle N (%)	Papworth N (%)	**TOTAL N (%)**
Donor BMI (kg/m^2)	Median (IQR)	25 (23, 30)	25 (22, 28)	24 (22, 28)	25 (23, 28)	27 (23, 31)	25 (23, 32)	**25 (23, 30)**
	Missing	0	1	1	0	0	0	**2**
Donor cause of death	Intracranial/CVA	24 (92)	23 (79)	33 (92)	24 (89)	22 (92)	28 (88)	**154 (89)**
	Trauma	0 (0)	2 (7)	0 (0)	0 (0)	0 (0)	2 (6)	**4 (2)**
	Others	2 (8)	4 (14)	3 (8)	3 (11)	2 (8)	2 (6)	**16 (9)**
Donor hypotension	No	15 (58)	20 (69)	33 (92)	26 (96)	12 (50)	26 (81)	**132 (76)**
	Yes	5 (19)	2 (7)	3 (8)	1 (4)	5 (21)	6 (19)	**22 (13)**
	Missing	6 (23)	7 (24)	0 (0)	0 (0)	7 (29)	0 (0)	**20 (12)**
Donor past diabetes	No	24 (92)	27 (93)	36 (100)	26 (96)	24 (100)	32 (100)	**169 (97)**
	Yes	0 (0)	1 (3)	0 (0)	1 (4)	0 (0)	0 (0)	**2 (1)**
	Missing	2 (8)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)	**3 (2)**
Donor past cardio disease	No	26 (100)	28 (97)	35 (97)	27 (100)	23 (96)	32 (100)	**171 (98)**
	Yes	0 (0)	0 (0)	0 (0)	0 (0)	1 (4)	0 (0)	**1 (1)**
	Missing	0 (0)	1 (3)	1 (3)	0 (0)	0 (0)	0 (0)	**2 (1)**
Donor past hypertension	No	23 (88)	25 (86)	32 (89)	25 (93)	23 (96)	30 (94)	**158 (91)**
	Yes	1 (4)	3 (10)	3 (8)	2 (7)	1 (4)	2 (6)	**12 (7)**
	Missing	2 (8)	1 (3)	1 (3)	0 (0)	0 (0)	0 (0)	**4 (2)**
Donor past tumour	No	21 (81)	27 (93)	35 (97)	27 (100)	24 (100)	30 (94)	**164 (94)**
	Yes	2 (8)	1 (3)	1 (3)	0 (0)	0 (0)	1 (3)	**5 (3)**
	Missing	3 (12)	1 (3)	0 (0)	0 (0)	0 (0)	1 (3)	**5 (3)**
Donor past smoker	No	11 (42)	14 (48)	17 (47)	10 (37)	12 (50)	10 (31)	**74 (43)**
	Yes	12 (46)	14 (48)	19 (53)	17 (63)	12 (50)	22 (69)	**96 (55)**
	Missing	3 (12)	1 (3)	0 (0)	0 (0)	0 (0)	0 (0)	**4 (2)**

Table 5.1 Demographic characteristics of UK adult heart transplants performed between 1 April 2024 and 31 March 2025, by centre

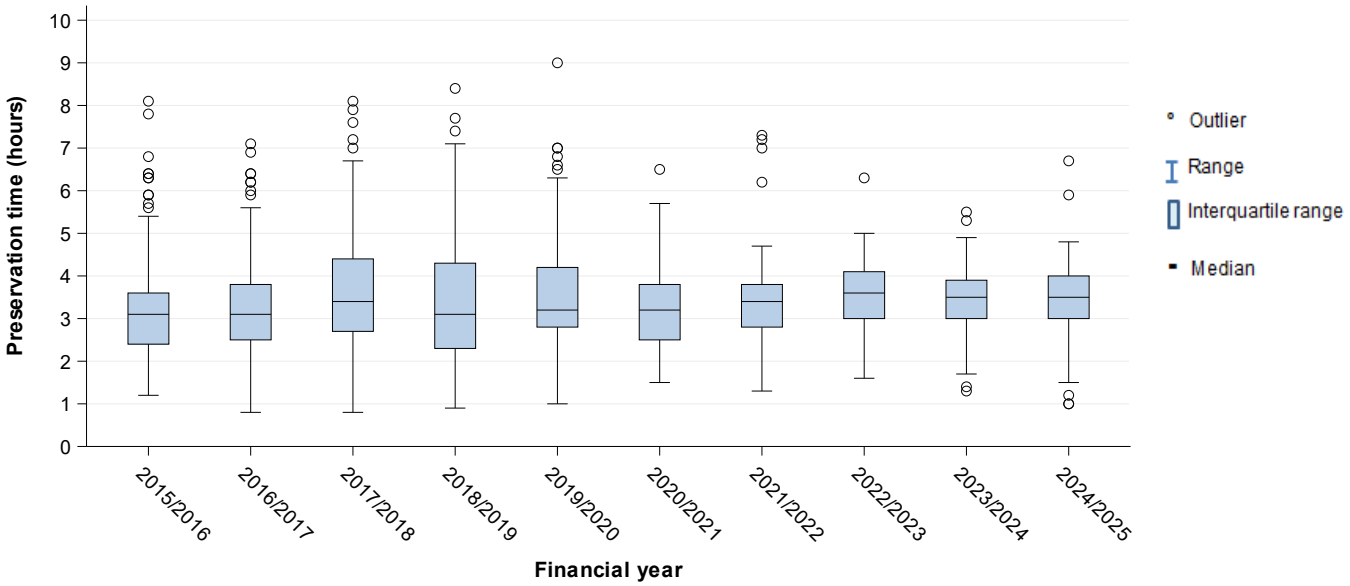
		Birmingham N (%)	Glasgow N (%)	Harefield N (%)	Manchester N (%)	Newcastle N (%)	Papworth N (%)	**TOTAL N (%)**
Total preservation time (hours)[1]	Median (IQR)	3.9 (3.3, 5.4)	3.9 (3.3, 4.8)	4.0 (3.1, 4.6)	3.7 (2.8, 4.8)	3.8 (3.5, 4.4)	3.7 (3.1, 4.4)	**3.8 (3.3, 4.6)**
	Missing	6	6	3	3	0	0	**18**

[1] Time from cross clamp in the donor to reperfusion in the recipient, regardless of donor type

5.3 Total preservation time, 1 April 2015 – 31 March 2025

Figure 5.7 shows boxplots of the total preservation time for DBD donor hearts transplanted into adult recipients over the last 10 years. The total preservation time is the difference between donor cross-clamp and recipient reperfusion and can be considered the out of body time. Total preservation time was reported for 1,223 out of 1,308 adult DBD heart transplants. Of those 1,223, 146 (12%) donor hearts underwent machine perfusion. The national median total preservation time has increased slightly over the decade, from 3.1 hours in 2015/2016 to 3.5 hours in 2024/2025.

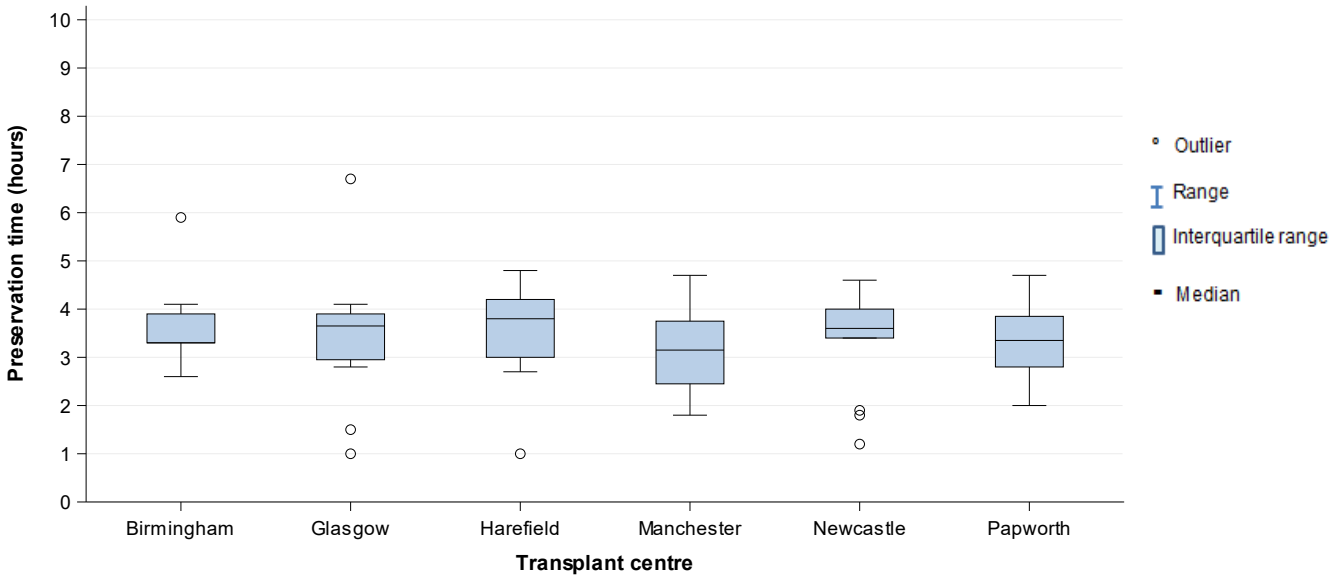
Figure 5.7 Boxplots of total preservation time for DBD donor hearts transplanted into adult recipients, by financial year, 1 April 2015 to 31 March 2025



Note: No adjustment has been made for the use of organ machine perfusion which was reported in 12% of transplants analysed

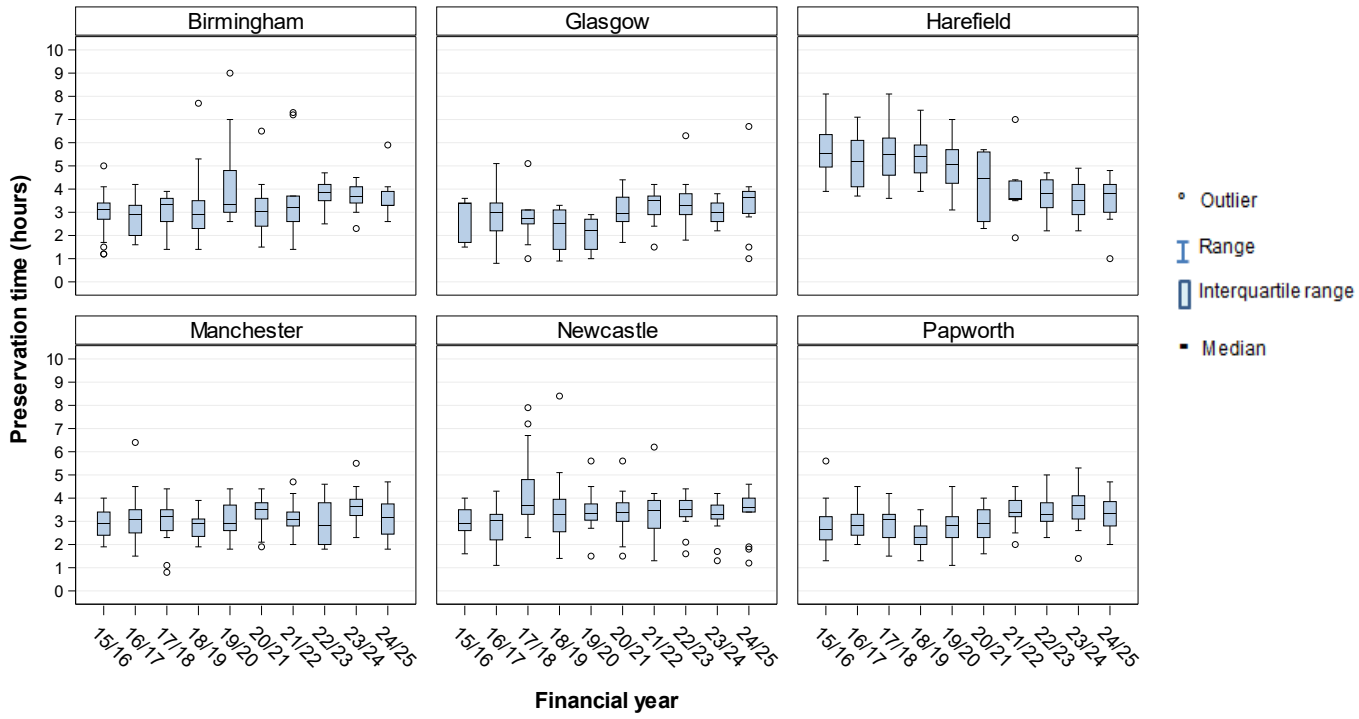
Figure 5.8 and **Figure 5.9** show boxplots of total preservation time by centre in the latest financial year and over the last 10 years, respectively. Between 2015/2016 and 2019/2020, Harefield used the Organ Care System (OCS) for 100% of DBD hearts transplanted, compared with 2%-9% for other centres during the same period. In 2023/2024, hypothermic oxygenated perfusion was used in 1 DBD heart transplant performed at Papworth as part of a randomised controlled trail.

Figure 5.8 Boxplots of total preservation time for DBD donor hearts transplanted into adult recipients, by transplant centre, 1 April 2024 to 31 March 2025



Note: Machine perfusion was used in 1 adult DBD heart transplant at Glasgow in 2024/2025

Figure 5.9 Boxplots of total preservation time for DBD donor hearts transplanted into adult recipients, by transplant centre and financial year, 1 April 2015 to 31 March 2025



Note: Includes time on the Organ Care System (OCS), where most centres used the OCS in a small proportion of transplants, except Harefield who used the OCS in 100% of transplants from 2014/2015 to 2019/2020. Hypothermic oxygenated perfusion was used in 1 DBD heart transplant performed at Papworth in 2023/2024. No adjustment has been made for use of machine perfusion.

ADULT HEART TRANSPLANTATION

Post-Transplant Survival

6. Post-Transplant Survival

This section presents survival post adult heart transplantation. Funnel plots are used to compare the risk-adjusted survival rate at each centre with the national rate. The risk-adjusted rates seek to compare centre performance after accounting for differences in case mix across centres. The unadjusted survival rates are also presented in the tables, showing the observed survival experience at that centre. The risk factors used to produce the risk-adjusted survival rates are listed in **Appendix A3**.

The survival analyses in **Section 6.1-6.3** include all first-time heart only transplants for the unadjusted analyses, and first time DBD heart only transplants for the risk-adjusted analyses. Ninety-day and 1-year survival rates are based on transplants performed in the period 1 April 2020 to 31 March 2024 while 5-year survival rates are based on transplants performed in the period 1 April 2016 to 31 March 2020. Survival rates are presented by transplant centre in **Tables 6.1-6.3** and **Figures 6.1-6.3**, by disease group in **Tables 6.4-6.5** and by VAD status at time of transplant in **Table 6.6**. Survival following DCD heart transplantation is provided separately in **Section 6.4** and survival outcomes following multi-organ heart transplantation are summarised in **Section 6.5**.

6.1 Survival by centre

Table 6.1, **Figure 6.1a**, and **Figure 6.1b**, show the 90-day post-transplant unadjusted (DBD and DCD transplants) and risk-adjusted (DBD transplants only) patient survival rates for each centre and nationally for the 653 (491 DBD) first adult heart only transplants in the period 1 April 2020 to 31 March 2024. All centres' DBD patient survival rates were statistically consistent with the national DBD rate of survival. The overall (DBD and DCD) national patient survival rate at 90 days post-transplant was 92.9%.

Table 6.1 90 day patient survival after first adult heart transplant, by centre, 1 April 2020 to 31 March 2024

Centre	Number of transplants	Unadjusted % 90 day survival (95% CI)		DBD transplants	Risk-adjusted % 90 day survival (95% CI)	
Birmingham	100	94.0	(87.1 - 97.3)	83	93.9	(83.9 - 97.7)
Glasgow	115	94.8	(88.8 - 97.6)	94	93.8	(85.0 - 97.4)
Harefield	118	92.4	(85.9 - 96.0)	80	91.5	(82.1 - 95.9)
Manchester	66	92.4	(82.8 - 96.8)	56	92.4	(81.7 - 96.8)
Newcastle	111	90.9	(83.8 - 95.0)	82	91.6	(83.8 - 95.6)
Papworth	143	93.0	(87.4 - 96.2)	96	89.9	(80.7 - 94.8)
UK	**653**	**92.9**	**(90.7 - 94.7)**	**491**		

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

Figure 6.1a Risk-adjusted 90 day patient survival rates for adult DBD heart transplants, by centre, 1 April 2020 to 31 March 2024

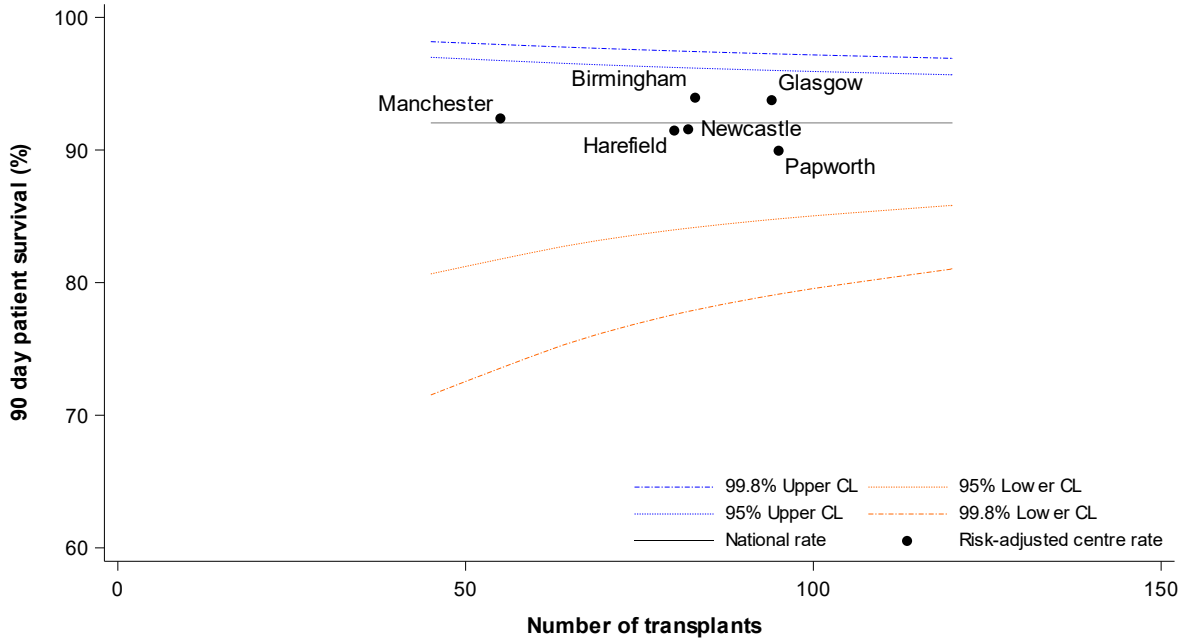


Figure 6.1b Unadjusted 90 day patient survival rates for adult heart transplants, by centre, 1 April 2020 to 31 March 2024

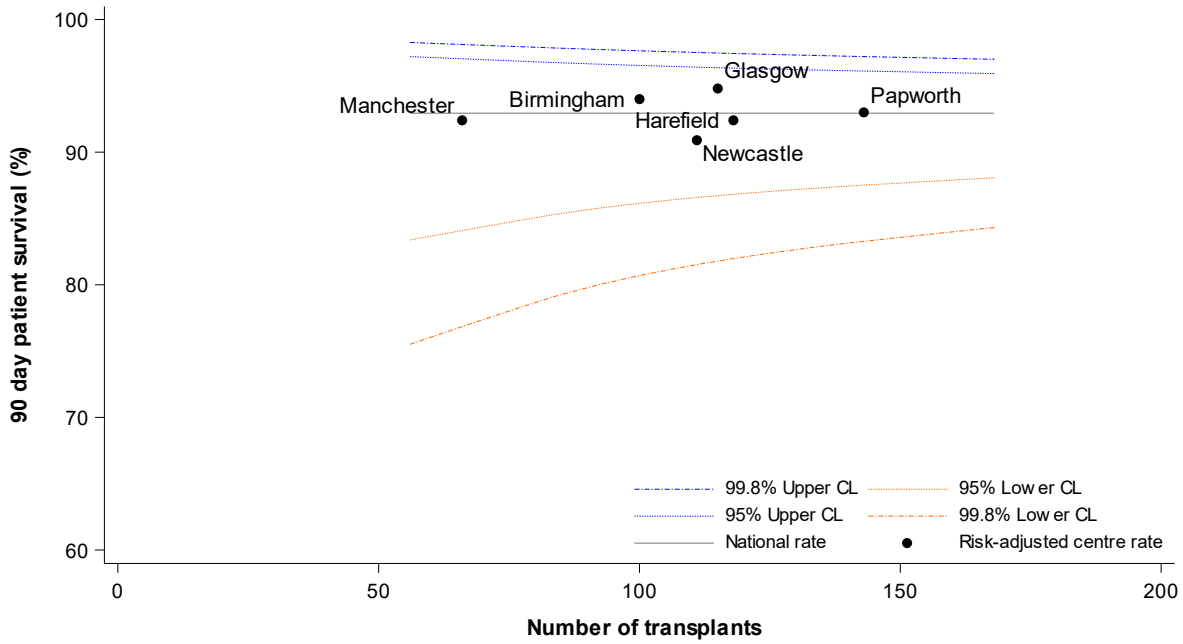


Table 6.2, **Figure 6.2a**, and **Figure 6.2b**, show the 1-year post-transplant unadjusted (DBD and DCD transplants) and risk-adjusted (DBD transplants only) patient survival rates for each centre and nationally for the 653 (491 DBD) first adult heart only transplants in the period 1 April 2020 to 31 March 2024. All centres' DBD patient survival rates were statistically consistent with the national DBD rate of survival. The overall (DBD and DCD) national patient survival rate at 1-year post-transplant was 89.0%.

Table 6.2 1 year patient survival after first adult heart transplant, by centre, 1 April 2020 to 31 March 2024

Centre	Number of transplants	Unadjusted % 1 year survival (95% CI)		DBD transplants	Risk-adjusted % 1 year survival (95% CI)	
Birmingham	100	89.7	(81.6 - 94.3)	83	94.1	(85.7 - 97.5)
Glasgow	115	92.2	(85.5 - 95.8)	94	89.9	(79.7 - 94.9)
Harefield	118	82.9	(74.7 - 88.6)	80	88.1	(78.4 - 93.4)
Manchester	66	90.9	(80.9 - 95.8)	56	89.8	(77.3 - 95.4)
Newcastle	111	89.1	(81.6 - 93.6)	82	88.1	(77.8 - 93.6)
Papworth	143	90.2	(84.0 - 94.1)	96	87.8	(78.0 - 93.2)
UK	**653**	**89.0**	**(86.4 - 91.2)**	**491**		

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

Figure 6.2a Risk-adjusted one year patient survival rates for adult DBD heart transplants, by centre, 1 April 2020 to 31 March 2024

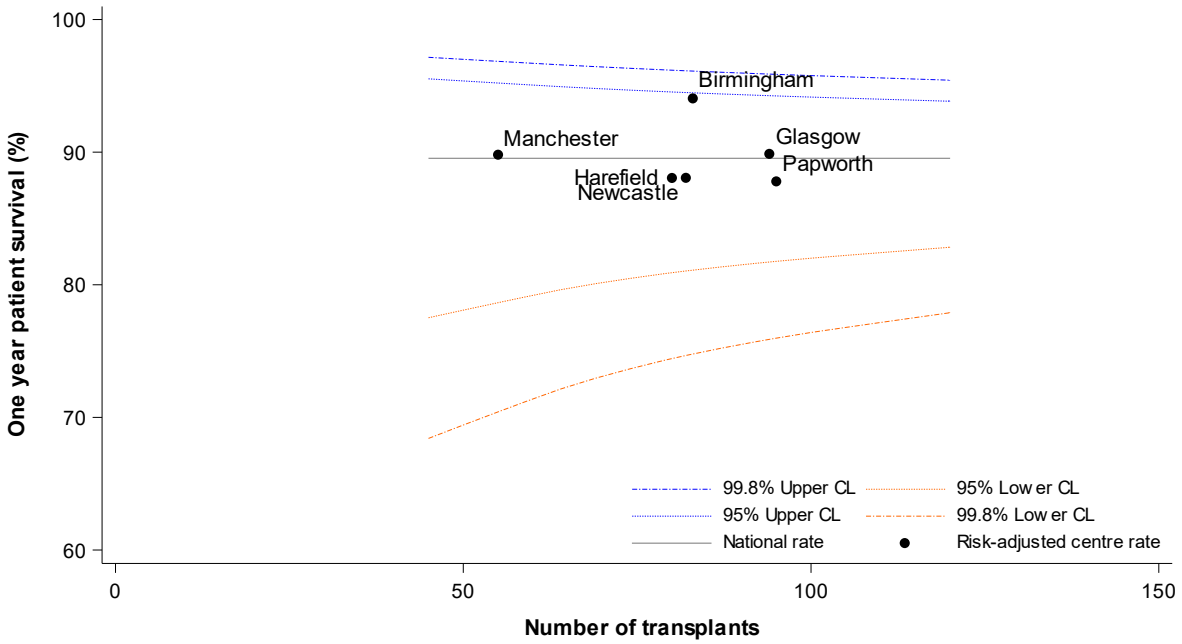


Figure 6.2b Unadjusted one year patient survival rates for adult heart transplants, by centre, 1 April 2020 to 31 March 2024

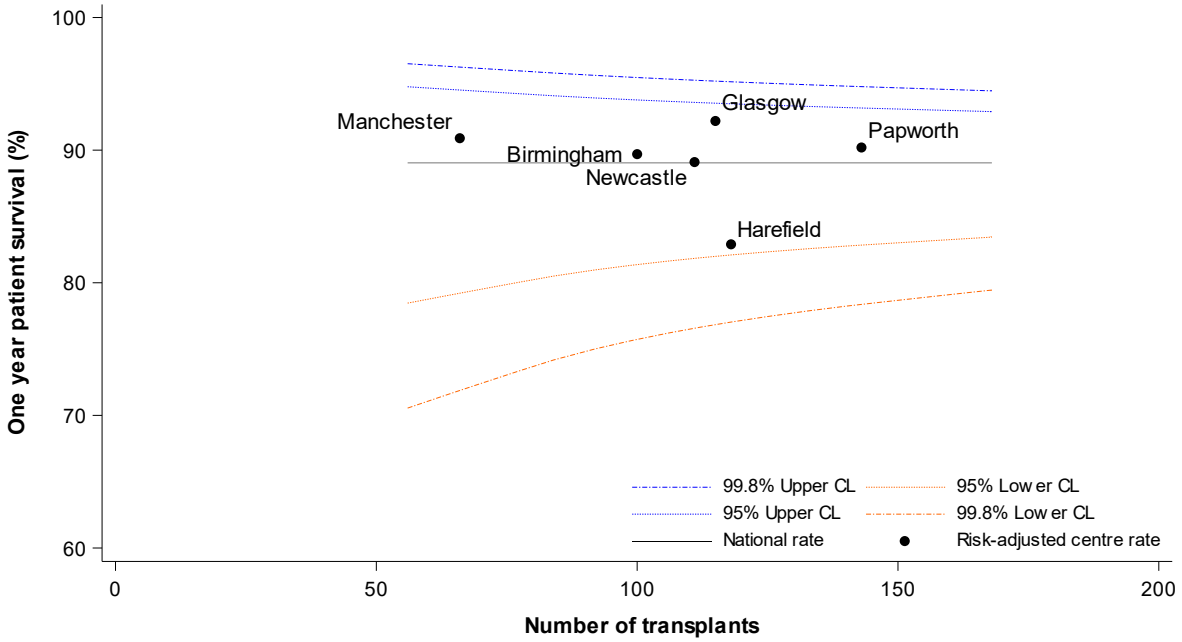


Table 6.3, **Figure 6.3a**, and **Figure 6.3b**, show the 5-year post-transplant unadjusted (DBD and DCD transplants) and risk-adjusted (DBD transplants only) patient survival rates for each centre and nationally for the 627 (538 DBD) first adult heart only transplants in the period 1 April 2016 to 31 March 2020. All centres' DBD patient survival rates were statistically consistent with the national DBD rate of survival. The overall (DBD and DCD) national patient survival rate at 5 years post-transplant was 74.8%.

Table 6.3 5 year patient survival after first adult heart transplant, by centre, 1 April 2016 to 31 March 2020

Centre	Number of transplants	Unadjusted % 5 year survival (95% CI)		DBD transplants	Risk-adjusted % 5 year survival (95% CI)	
Birmingham	101	75.1	(65.4 - 82.4)	101	75.5	(63.7 - 83.4)
Glasgow	46	79.9	(64.7 – 89.0)	45	74.9	(51.8 - 86.9)
Harefield	112	67.8	(58.2 - 75.6)	96	72.5	(60.9 - 80.6)
Manchester	91	80.2	(70.5 – 87.0)	82	81.6	(69.0 - 89.1)
Newcastle	94	67.8	(57.2 - 76.3)	93	72.3	(60.4 - 80.7)
Papworth	183	78.6	(71.9 - 83.9)	121	73.1	(60.8 - 81.6)
UK	**627**	**74.8**	**(71.2 - 78.1)**	**538**		

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

Figure 6.3a Risk-adjusted five year patient survival rates for adult DBD heart transplants, by centre, 1 April 2016 to 31 March 2020

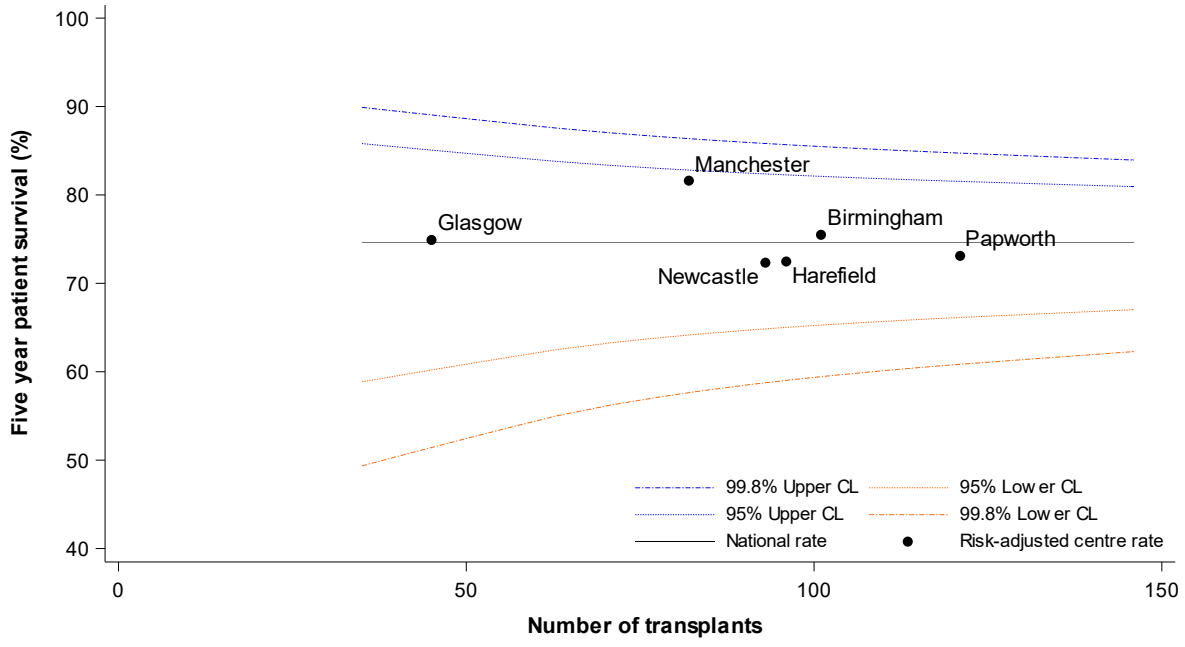
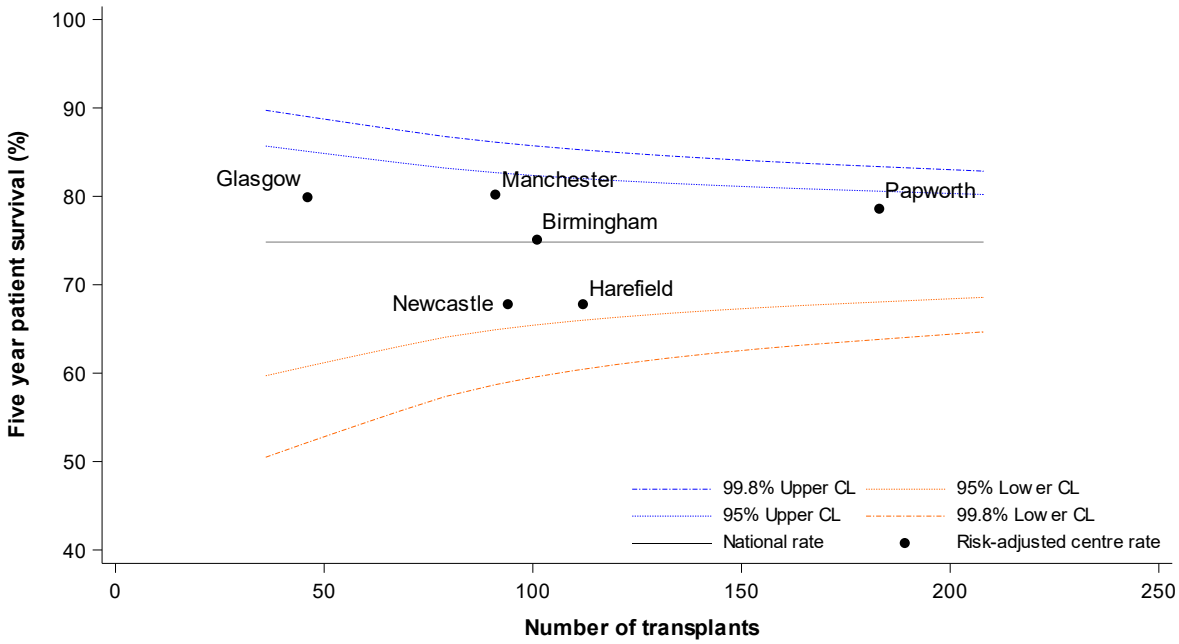


Figure 6.3b Unadjusted five year patient survival rates for adult heart transplants, by centre, 1 April 2016 to 31 March 2020



6.2 Survival by disease group

Tables 6.4 and **6.5** present unadjusted and risk-adjusted survival rates by primary disease group, at 1 year and 5 years post-transplant, respectively. The risk factors used to produce the risk-adjusted survival rates are listed in **Appendix A3** (except centre was used in place of disease group). Recipients in the congenital heart disease group had a lower than average risk-adjusted survival rate at 5 years.

Table 6.4 1 year patient survival after first adult DBD heart transplant, by disease group, 1 April 2020 to 31 March 2024

Disease group	Number of transplants	% 1 year survival (95% CI) Unadjusted		Risk-adjusted	
Cardiomyopathy	344	88.9	(85.0 - 91.8)	88.5	(84.2 - 91.6)
Congenital heart disease	46	89.1	(75.8 - 95.3)	88.8	(73.2 - 95.3)
Coronary heart disease	88	90.9	(82.6 - 95.3)	92.2	(84.4 - 96.1)
Other/not reported	13	100	-	100	-
UK	**491**	**89.5**	**(86.5 - 92)**		

Table 6.5 5 year patient survival after first adult DBD heart transplant, by disease group, 1 April 2016 to 31 March 2020

Disease group	Number of transplants	% 5 year survival (95% CI) Unadjusted		Risk-adjusted	
Cardiomyopathy	396	75.9	(71.4 - 79.8)	76.2	(70.9 - 80.5)
Congenital heart disease	40	60.0	(43.2 - 73.3)	54.9	(26.4 - 72.4)
Coronary heart disease	71	74.5	(62.5 - 83.1)	74.9	(60.2 - 84.2)
Other/Not reported	31	77.0	(57.8 - 88.3)	76.0	(49.7 - 88.6)
UK	**538**	**74.6**	**(70.7 - 78.1)**		

6.3 Survival by VAD status

Table 6.6 presents unadjusted survival rates by mechanical circulatory support (MCS) status at time of transplant at 30 days, 90 days, and 1 year post-transplant, respectively. Short-term MCS includes CentriMag, percutaneous VADs and extracorporeal membrane oxygenation and long-term MCS includes implantable VADs for left, right and biventricular support and total artificial hearts. There was a significant difference in 30-day, 90-day, and 1-year survival rates across MCS status in this unadjusted analysis (log-rank p=0.0002, p<0.0001, and p=0.0008 respectively), with those on long-term support at time of transplant having inferior survival.

Table 6.6 Unadjusted patient survival rates after first adult DBD heart transplant, by mechanical support status, 1 April 2020 to 31 March 2024

Mechanical support status	Number of transplants	% 30 day survival (95% CI) Unadjusted		% 90 day survival (95% CI) Unadjusted		% 1 year survival (95% CI) Unadjusted	
Short-term support	117	95.7	(90.0 - 98.2)	93.2	(86.8 - 96.5)	91.3	(84.4 - 95.2)
Long-term support	50	82.0	(68.3 - 90.2)	74.0	(59.5 – 84.0)	74.0	(59.5 – 84.0)
No support	323	96.6	(93.9 - 98.1)	94.4	(91.3 - 96.4)	91.3	(87.6 - 93.9)
UK	**491**	**94.9**	**(92.5 - 96.5)**	**92**	**(89.3 - 94.1)**	**89.5**	**(86.5 - 92)**

6.4 Survival post DCD heart transplant

Tables 6.7 and **6.8** present short-term patient survival rates following DCD heart only transplant, by centre and nationally, for the period 1 April 2016 to 31 March 2024.

Table 6.7 90 day patient survival after first DCD adult heart transplant, by centre, 1 April 2016 to 31 March 2024

Centre	Number of patients	Number of deaths	% 90 day survival (95% CI) (unadjusted)	
Birmingham	17	2	88.2	(60.6 - 96.9)
Glasgow	22	1	95.5	(71.9 - 99.3)
Harefield	54	5	90.7	(79.2 – 96.0)
Manchester	19	2	89.5	(64.1 - 97.3)
Newcastle	30	1	96.7	(78.6 - 99.5)
Papworth	109	5	95.4	(89.3 - 98.1)
UK	**251**	**16**	**93.6**	**(89.8 – 96.0)**

Table 6.8 1 year patient survival rates after first adult DCD heart only transplant, by 1 April 2016 to 31 March 2024

Centre	Number of patients	Number of deaths	% 1 year survival (95% CI) (unadjusted)	
Birmingham	17	5	68.8	(40.0 - 85.9)
Glasgow	22	1	95.5	(71.9 - 99.3)
Harefield	54	14	74.1	(60.2 - 83.7)
Manchester	19	3	84.2	(58.7 - 94.6)
Newcastle	30	2	93.2	(75.5 - 98.3)
Papworth	109	10	90.8	(83.6 – 95.0)
UK	**251**	**35**	**86.0**	**(81.0 - 89.7)**

6.5 Survival post multi-organ heart transplant

The survival outcomes of the small number of recipients of multi-organ heart transplants are reported in **Table 6.9**, at 90 days and 1 year post transplant. This includes all first-time multi-organ transplants involving the heart, from DBD or DCD donors, between 1 April 2016 and 31 March 2024. It does not include heart-lung transplants which are reported in the Annual Report on Lung Transplantation.

Table 6.9 Survival outcomes following multi-organ heart transplant performed between 1 April 2016 and 31 March 2024

Transplant type	Number of transplants N	Number of patients alive at 90 days post-transplant N	Number of patients alive at 1 year post-transplant N
Heart & kidney	5	4	4
Heart & liver	8	5	5

ADULT HEART TRANSPLANTATION

Survival from Listing

7. Survival from Listing

Survival from listing was analysed for patients 16 years or older registered for the first time for a heart transplant between 1 April 2016 and 31 March 2024. Survival time was defined as the time from joining the transplant list to death, regardless of whether the patient was transplanted, and any factors associated with such a transplant e.g. donor type. Survival time was censored at the last known follow-up date post-transplant when no death date was recorded, or at time of analysis if the patient was still active on the transplant list, or at date of removal from the list for patients not receiving a transplant (unless removed due to deteriorating condition, in which case this was classed as an event). A review of the risk factors included in the survival from listing model was conducted in 2024 and the factors used to produce the risk-adjusted survival rates are listed in **Appendix A2.1**.

1 and 5 year risk-adjusted survival rates from the point of heart transplant listing are shown as funnel plots in **Figures 7.1** and **7.2,** respectively. These rates are also shown in **Tables 7.1** and **7.2**, respectively, along with the unadjusted rates. Note that the rates for 1 year and 5-year survival are calculated from disjoint cohorts of patients, to allow for the full 1- and 5-year follow-up periods to elapse.

The centre specific survival from listing rates at 1 year were all consistent with the national rate of 87.1%. The 5-year survival rate for Manchester was above the 99.8% upper confidence limits, indicating a significantly high survival from listing at this centre. There was also evidence of a higher rate at Papworth, whose rate lies above the 95% upper confidence limits. Newcastle's 5-year survival rate fell below the lower 99.8% confidence limits, indicating a significantly low survival rate at this centre, while Harefield's rate fell below the 95% lower confidence limits, indicating somewhat lower five-year survival from listing. Glasgow and Birmingham had five-year survival from listing rates that were consistent with the national rate.

Table 7.1 **1 year patient survival from listing for patients registered between 1 April 2020 to 31 March 2024**

Centre	Number of patients	Unadjusted % 1 year survival (95% CI)		Risk-adjusted % 1 year survival (95% CI)	
Birmingham	132	85.8	(78.3 - 90.8)	87.3	(79.9 - 92.0)
Glasgow	115	91.2	(84.3 - 95.2)	90.9	(83.1 - 95.1)
Harefield	170	84.1	(77.5 - 88.9)	85.1	(78.2 - 89.9)
Manchester	105	82.5	(73.6 - 88.6)	82.8	(72.7 - 89.2)
Newcastle	155	88.0	(81.7 - 92.3)	87.1	(79.6 - 91.9)
Papworth	166	90.2	(84.4 - 93.9)	89.2	(82.4 - 93.4)
UK	**843**	**87.1**	**(84.6 - 89.2)**		

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

Figure 7.1 **Risk-adjusted one year patient survival rates from listing by centre, 1 April 2020 to 31 March 2024**

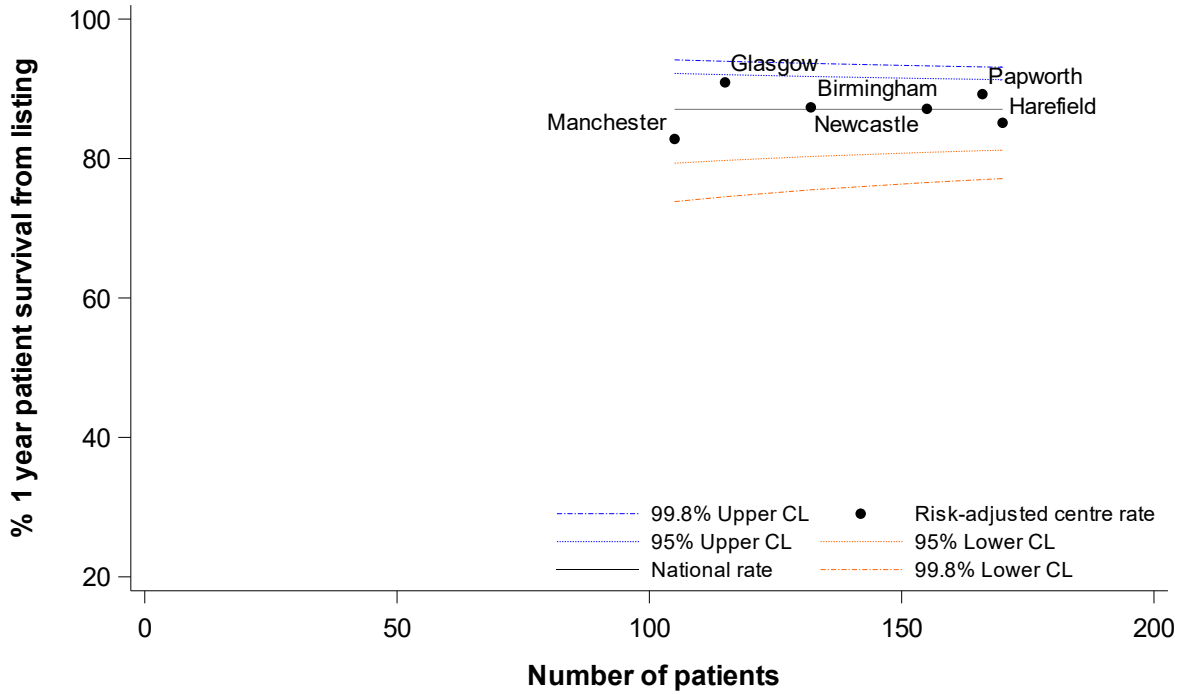
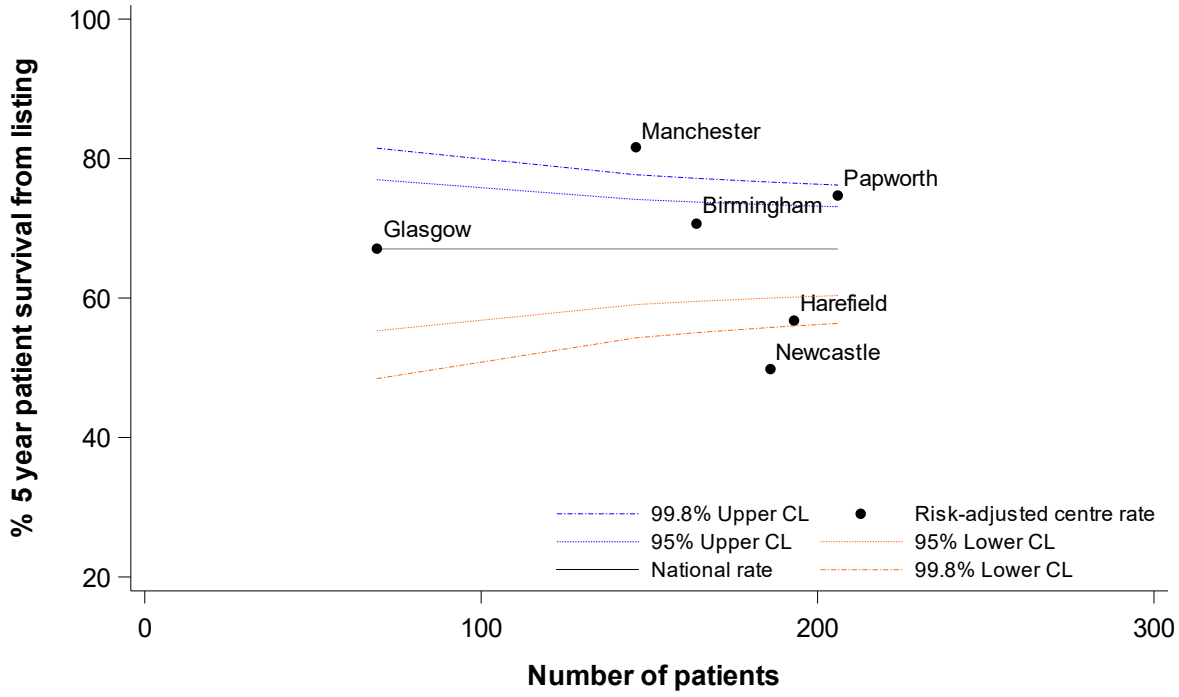


Table 7.2 5 year patient survival from listing for patients registered between 1 April 2016 to 31 March 2020

Centre	Number of patients	Unadjusted % 5 year survival (95% CI)		Risk-adjusted % 5 year survival (95% CI)	
Birmingham	164	70.1	(62.0 - 76.9)	70.7	(60.6 - 78.2)
Glasgow	69	74.8	(62.7 - 83.5)	67.1	(47.0 - 79.5)
Harefield	193	57.2	(49.4 - 64.2)	56.8	(45.7 - 65.6)
Manchester	146	77.5	(69.8 - 83.6)	81.6	(74.0 - 87.0)
Newcastle	186	52.9	(45.2 - 60.1)	49.8	(37.7 - 59.6)
Papworth	206	75.5	(68.8 - 80.9)	74.7	(66.5 - 80.9)
UK	**964**	**67.0**	**(63.8 – 70.0)**		

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

Figure 7.2 Risk-adjusted five year patient survival rates from listing by centre, 1 April 2016 to 31 March 2020



ADULT HEART TRANSPLANTATION

Form Return Rates

8. Adult heart form return rates, 1 January 2024 – 31 December 2024

Form return rates are reported in **Table 8.1** for the cardiothoracic transplant record and the 3 month and 1 year follow up form, along with lifetime follow up (2 years or more). These include all adult heart transplants between 1 January and 31 December 2024 for the transplant record, and all follow up forms issued in this time period. Centres highlighted are the currently active transplant centres. All active centres have a 96% or greater return rate for this period. Note that any skipped follow-up forms are counted as not returned.

Table 8.1 Form return rates for adult heart transplants, 1 January 2024 to 31 December 2024

Centre	Transplant record		3 month follow-up		1 year follow-up		Lifetime follow-up	
	N	% Returned	N	% Returned	N	% Returned	N	% Returned
Belfast, Belfast City Hospital	-	-	-	-	-	-	4	0
Birmingham, Queen Elizabeth Hospital	31	100	35	100	32	100	272	97
Royal Devon And Exeter Hospital	-	-	-	-	-	-	1	0
Glasgow, Golden Jubilee N. Hospital	26	100	27	100	34	100	191	98
Harefield Hospital	31	100	34	100	42	100	523	96
Leeds General Infirmary	-	-	-	-	-	-	1	0
Londonderry, Altnagelvin Area Hospital	-	-	-	-	-	-	1	0
Manchester, Wythenshawe Hospital	27	100	23	100	13	100	281	98
Newcastle, Freeman Hospital	26	100	29	100	35	97	316	98
Oxford, John Radcliffe Hospital	-	-	-	-	-	-	1	0
Papworth, Papworth Hospital	30	100	26	100	33	100	636	97
Plymouth, Derriford Hospital	-	-	-	-	-	-	2	0
Sheffield, Northern General Hospital	-	-	-	-	-	-	29	90
Truro, Royal Cornwall Hospital	-	-	-	-	-	-	2	100
Overall	**201**	**100**	**192**	**100**	**157**	**100**	**2224**	**97**

PAEDIATRIC HEART TRANSPLANTATION

Transplant List

9.1 Paediatric heart only transplant list on 31 March, 2016 – 2025

Figure 9.1 shows the number of paediatric patients on the heart transplant list on 31 March each year between 2016 and 2025 split by urgency status. The number on the active non-urgent heart transplant list generally increased over the decade, peaking in 2023 before falling to 22 on 31 March 2025. The number on the urgent transplant list also increased, with 17 paediatric patients waiting in 2025 compared to 11 in 2024. The paediatric super-urgent list, introduced in October 2020, has remained very low, with no patients waiting on 31 March 2025.

Figure 9.1 Number of paediatric patients on the heart transplant list at 31 March each year, by urgency status

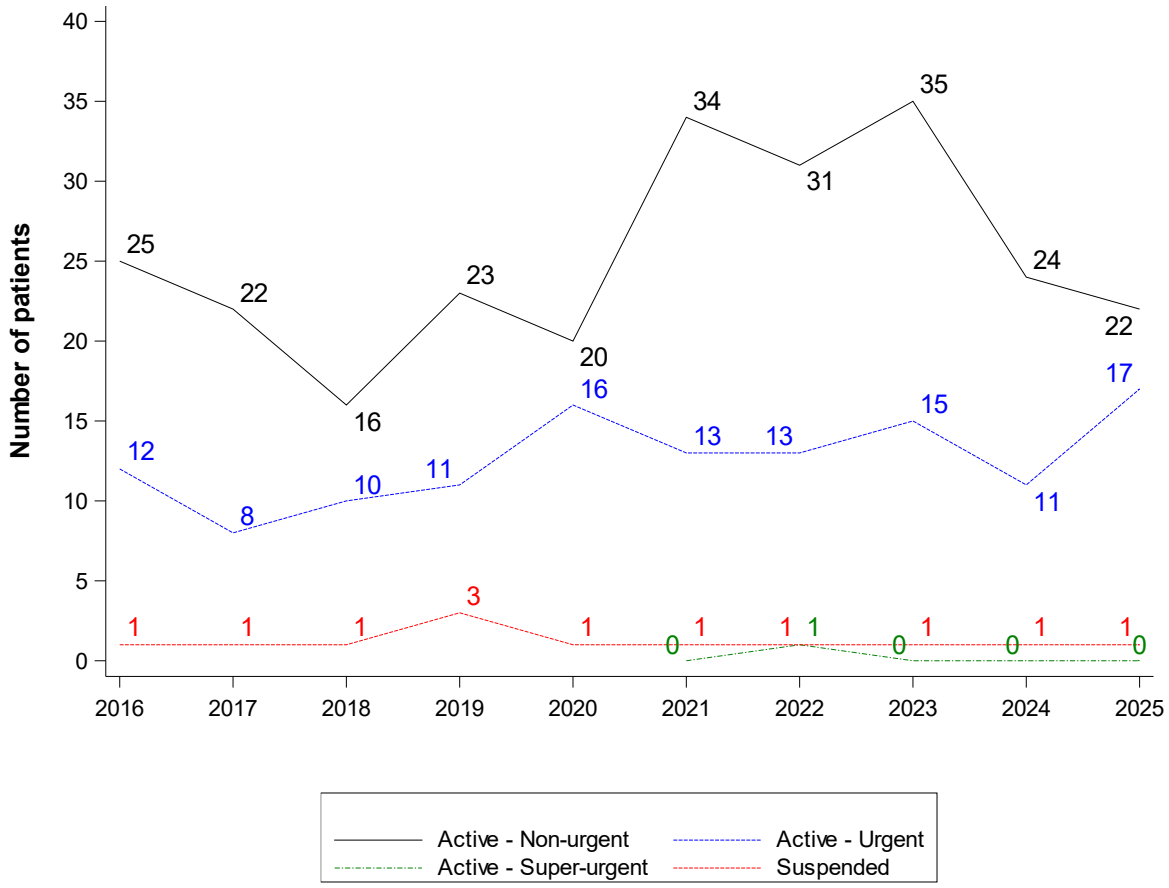


Figure 9.2 shows the number of paediatric patients on the active heart transplant list on 31 March 2025 by centre and urgency. In total, there were 39 paediatric patients waiting; 16 at Great Ormond Street Hospital, of which 8 were urgent, and 23 at Newcastle, of which 9 were urgent. **Figure 9.3** shows the number split by centre and mechanical circulatory support (MCS) status where MCS includes ventricular assist devices and extracorporeal membrane oxygenation. A total of 13 (33%) patients on the paediatric heart list were on MCS on 31 March 2025.

Figure 9.2 Number of paediatric patients on the active heart transplant list at 31 March 2025, by centre and urgency

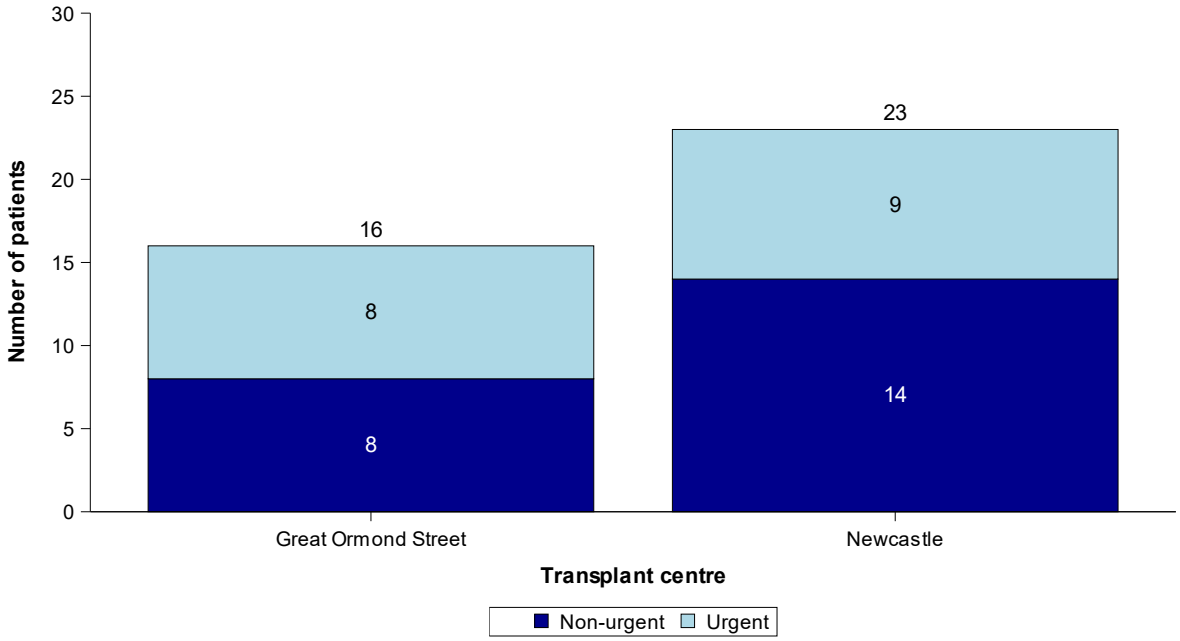


Figure 9.3 Number of paediatric patients on the active heart transplant list at 31 March 2025, by centre and mechanical circulatory support status

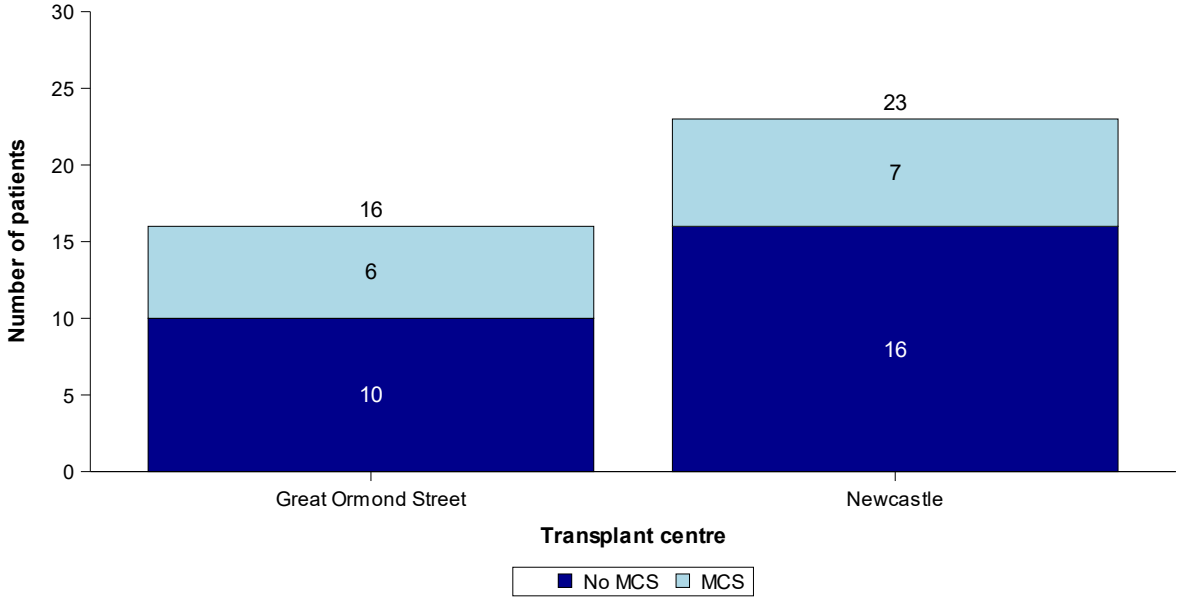


Figure 9.4 shows the trend over time in the number of paediatric patients on the heart transplant list on 31 March each year across each centre. There has been a recent decrease in Great Ormond Street Hospital's non-urgent list, while their non-urgent list has remained reasonably stable. Newcastle's non-urgent list has been relatively high for the last 5 years, and their urgent list has also increased over time.

Figure 9.4 Number of paediatric patients on the heart transplant list at 31 March each year, for the last 10 years, by centre and urgency status

9.2 Demographic characteristics, 1 April 2024 and 31 March 2025

There were 55 paediatric registrations onto the heart transplant list between 1 April 2024 and 31 March 2025. Demographic characteristics of these individuals are shown by centre and overall, in **Table 9.1**. Nationally, 56% were male and the median age was 8 years. The most common primary disease group was cardiomyopathy. For some characteristics, due to rounding, percentages may not add up to 100.

Table 9.1 Demographic characteristics of paediatric patient registrations onto the heart transplant list between 1 April 2024 and 31 March 2025, by centre

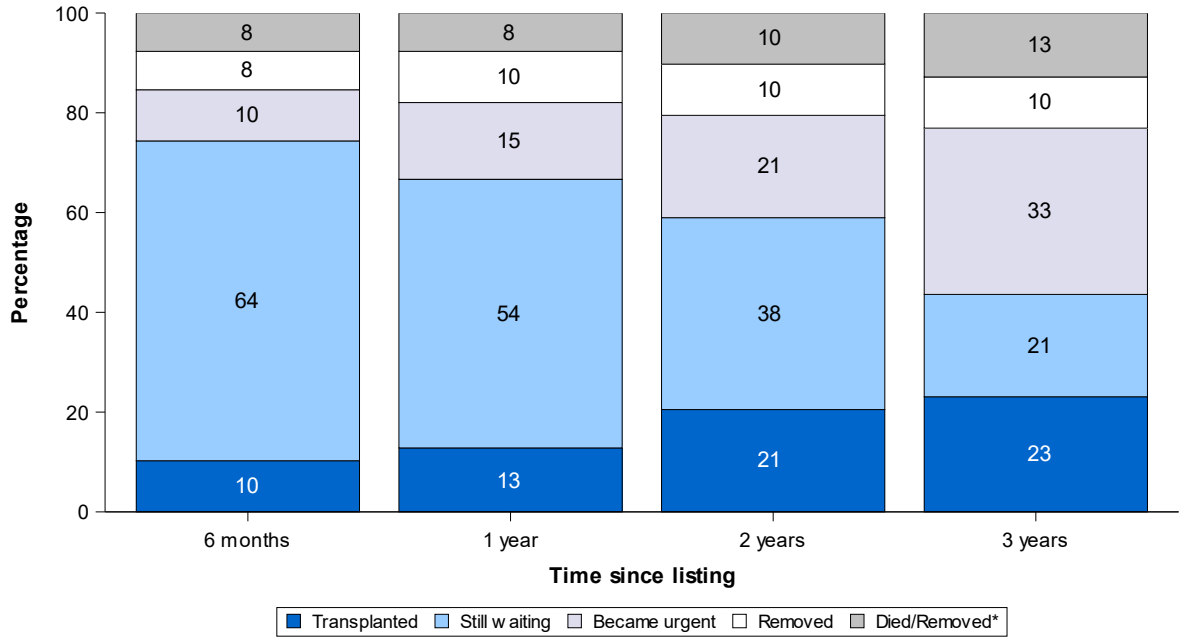
		Great Ormond Street N (%)	Newcastle N (%)	**TOTAL N (%)**
Number of registrations		30 (100)	25 (100)	**55 (100)**
Highest urgency during registration	Non-urgent	5 (17)	7 (28)	**12 (22)**
	Urgent	16 (53)	13 (52)	**29 (53)**
	Super-urgent	9 (30)	5 (20)	**14 (26)**
Recipient sex	Male	14 (47)	17 (68)	**31 (56)**
	Female	16 (53)	8 (32)	**24 (44)**
Recipient ethnicity	White	22 (73)	14 (56)	**36 (66)**
	Asian	4 (13)	8 (32)	**12 (22)**
	Black	1 (3)	2 (8)	**3 (6)**
	Other	3 (10)	1 (4)	**4 (7)**
Recipient age (years)	Median (IQR)	10 (3, 13)	7 (4, 10)	**8 (3, 12)**
	Missing	0	0	**0**
Height (cm)	Median (IQR)	138 (96, 161)	120 (102, 135)	**124 (96, 153)**
	Missing	0	0	**0**
Weight (kg)	Median (IQR)	34 (13, 50)	21 (15, 34)	**23 (13, 44)**
	Missing	0	0	**0**
Primary Disease	Cardiomyopathy	22 (73)	13 (52)	**35 (64)**
	Congenital heart disease	7 (23)	10 (40)	**17 (31)**
	Other/Not reported	1 (3)	2 (8)	**3 (6)**
Previous open heart surgery	None	24 (80)	7 (28)	**31 (56)**
	One	2 (7)	6 (24)	**8 (15)**
	More than one	4 (13)	8 (32)	**12 (22)**
	Missing	0 (0)	4 (16)	**4 (7)**
Serum bilirubin (umol/l)	Median (IQR)	16 (10, 26)	7 (6, 15)	**12 (7, 22)**
	Missing	2	4	**6**
Serum creatinine (umol/l)	Median (IQR)	41 (26, 60)	41 (33, 55)	**41 (28, 58)**
	Missing	1	4	**5**

9.3 Post-registration outcomes, 1 April 2020 – 31 March 2022

The registration outcomes of paediatric patients listed for a heart transplant between 1 April 2020 – 31 March 2022 are summarised in **Figure 9.5** and **Figure 9.6**, for non-urgent and urgent registrations, respectively (super-urgent registration outcomes are not presented due to small numbers). The possible outcomes on the non-urgent or urgent list include receiving a transplant, removal from the list, moving lists, dying on the list, or remaining on the list at a given time point post-registration. Removals from the list due to deteriorating condition are grouped with deaths in this analysis. In these figures, the *first* outcome is used, so if an individual was transplanted then died their registration outcome would be "transplanted". If they moved lists, e.g. from the non-urgent to the urgent list, they would be included in both the non-urgent and the urgent charts and analysed according to the outcome on each list.

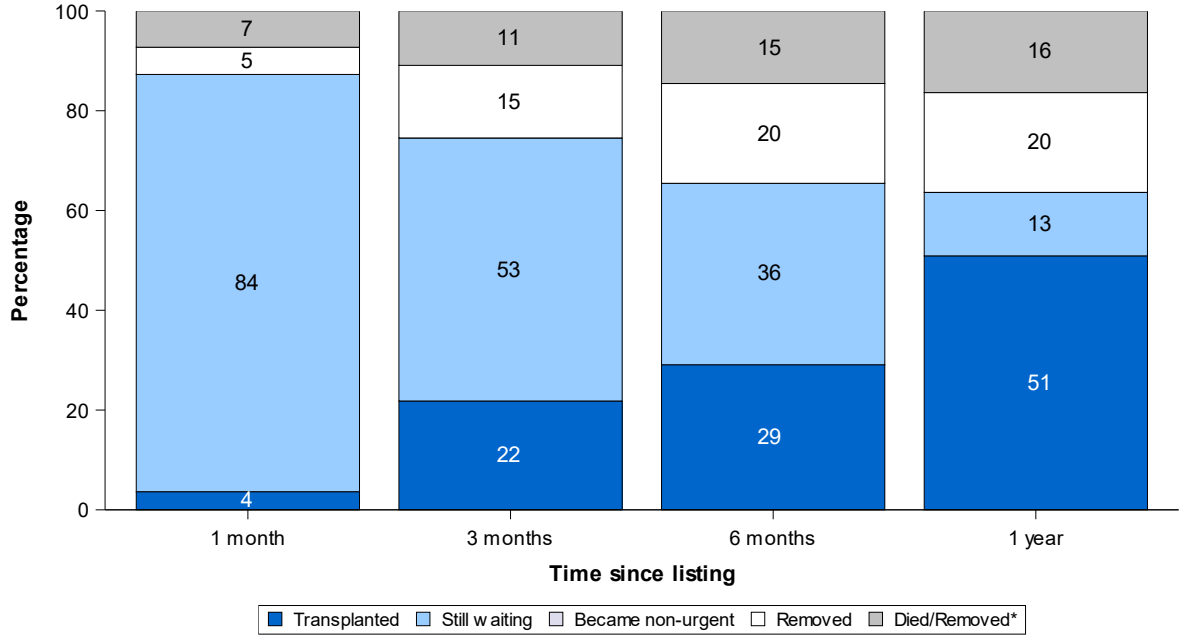
Within the first 6 months of listing, it is shown that 10% had received a transplant, 8% had died and 10% had been moved to the urgent list. At 3 years, 23% had been transplanted, however, 33% of had been added to the urgent list. As can be seen in **Figure 9.6**, paediatric patients have a greater chance of transplant on the urgent heart list compared to the non-urgent list, with 29% receiving a transplant by 6 months. Removals from the urgent list were mainly due to improved condition (excluding those removals due to deteriorating condition which are grouped with deaths).

Figure 9.5 Post-registration outcome for 39 new non-urgent heart only registrations made in the UK, 1 April 2020 to 31 March 2022



***Removals due to condition deteriorating**

Figure 9.6 Post-registration outcome for 55 new urgent heart only registrations made in the UK, 1 April 2020 to 31 March 2022



***Removals due to condition deteriorating**

9.4 Median waiting time to transplant, 1 April 2021 to 31 March 2024

Table 9.2 shows the median waiting time to heart transplant from listing for paediatric patients registered between 1 April 2021 to 31 March 2024. This is estimated using the Kaplan Meier method, at allow for censoring, and is split by urgency at initial registration; non-urgent or urgent. All waiting time from initial registration is considered, regardless of any change in urgency. Any suspended time is discounted.

The national median waiting time to paediatric heart transplant was 907 days from non-urgent registration and 144 days from urgent registration. The median waiting time to heart transplant for paediatric patients is also considered by blood group in **Table 9.3**. Median waiting time to super-urgent transplant is not presented due to small numbers.

Table 9.2 Median active waiting time to heart transplant for paediatric patients registered on the transplant list, by urgency at registration and centre, 1 April 2021 to 31 March 2024

Transplant centre	Number registered	Number transplanted	Waiting time (days) Median	95% Confidence interval
Non-urgent at initial registration				
Great Ormond Street	21	11	835	267 - 1403
Newcastle	18	8	917	723 - 1111
UK	**39**	**19**	**907**	**780 - 1034**
Urgent at initial registration				
Great Ormond Street	40	30	144	0 - 295
Newcastle	36	22	139	71 - 207
UK	**76**	**52**	**144**	**53 - 235**

Table 9.3 Median active waiting time to heart transplant for paediatric patients registered on the transplant list, by urgency at registration and blood group, 1 April 2021 to 31 March 2024

Blood Group	Number registered	Number transplanted	Waiting time (days) Median	95% Confidence interval
Non-urgent at initial registration				
O[1]	22	9	-	-
A[2]	7	5	-	-
B[2]	9	5	-	-
AB[2]	1	0	-	-
UK	**39**	**19**	**907**	**780 - 1034**
Urgent at initial registration				
O	35	25	193	95 - 291
A	23	15	69	0 - 251
B[1]	14	9	-	-
AB[2]	4	3	-	-
UK	**76**	**52**	**144**	**53 - 235**

[1] Median and 95% confidence intervals could not be calculated due to low transplant rate
[2] Median waiting time for groups with less than 10 are not presented due to small numbers

PAEDIATRIC HEART TRANSPLANTATION

Response to Offers

10. Response to Offers

Table 10.1 compares individual centre paediatric heart offer decline rates over the 3 years between 1 April 2022 and 31 March 2025. This only considers offers of hearts from UK DBDs aged less than 16 that were eventually transplanted and excludes fast track offers. Hearts offered as part of a heart-lung block are included. Non-urgent, urgent and super-urgent offers are all considered. Offers to adults at Newcastle are excluded.

The number of offers received per year from paediatric DBD donors whose heart was donated is small. In 2024/2025, the number was especially small, at just 7, so these results should be interpreted with caution.

Table 10.1 UK paediatric DBD donor heart offer decline rates by transplant centre and year, 1 April 2022 and 31 March 2025

Centre	2022/23		2023/24		2024/25		Overall	
	No. offers	Decline rate (%)	No. offers	Decline rate (%)	No. offers	Decline rate (%)	No. offers	Decline rate (%)
Great Ormond Street Hospital	14	64.3	17	76.5	4	25.0	35	65.7
Newcastle	10	40.0	14	78.6	3	33.3	27	59.3
UK	**24**	**54.2**	**31**	**77.4**	**7**	**28.6**	**62**	**62.9**

PAEDIATRIC HEART TRANSPLANTATION

Transplants

11.1 Paediatric heart transplants, 1 April 2015 – 31 March 2025

Figures 11.1 and **11.2** show the number of paediatric heart transplants performed in the last 10 years by donor type, nationally and by centre, respectively. Nationally, the number of paediatric heart transplants decreased to its lowest point in 2019/2020 (23), then steadily increased, reaching 37 in 2023/2024, a level comparable to a decade earlier, before dropping again to 26 in 2024/2025. Last year's activity is shown by centre in **Figure 11.3**. The 26 transplants carried out in 2024/2025 comprised 16 at Great Ormond Street Hospital and 10 at Newcastle, and there was a total of 9 DCD heart transplants.

Figure 11.1 Number of paediatric heart transplants in the UK, by financial year and donor type, 1 April 2015 to 31 March 2025

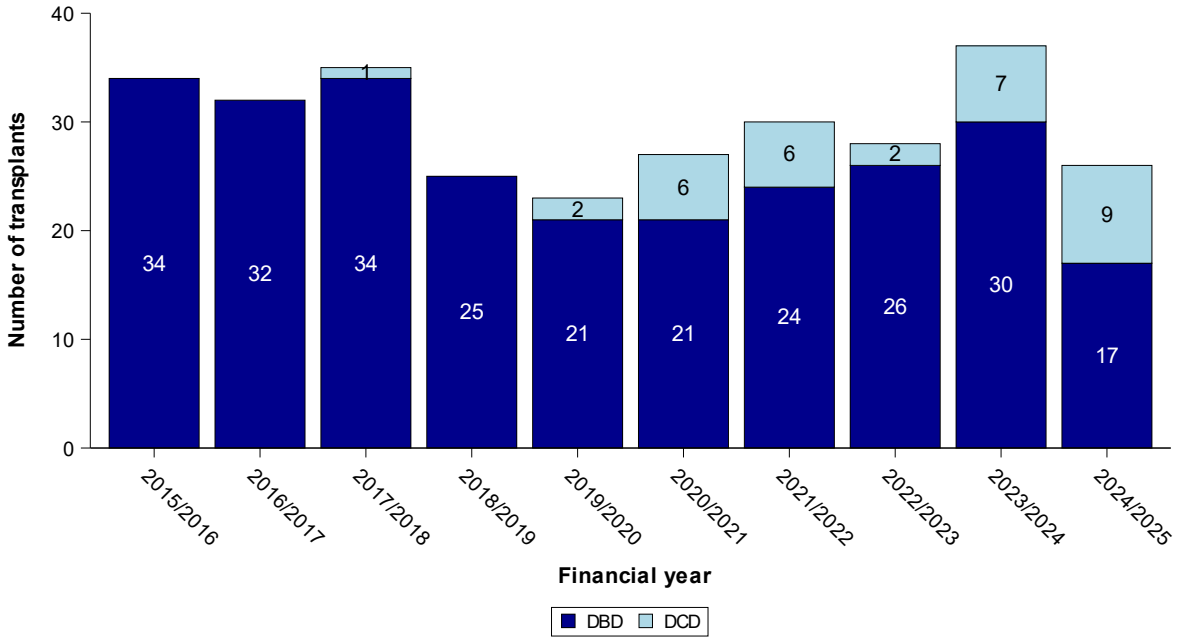


Figure 11.2 Number of paediatric heart transplants in the UK, by financial year, centre and donor type, 1 April 2015 to 31 March 2025

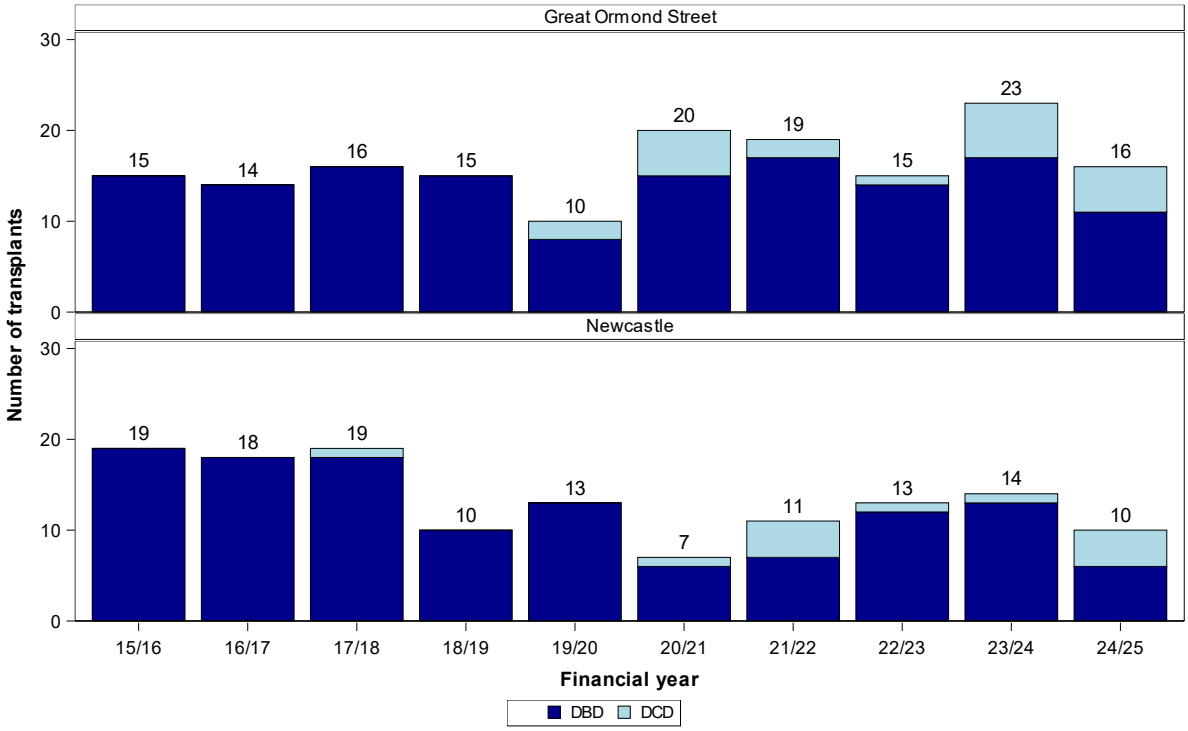
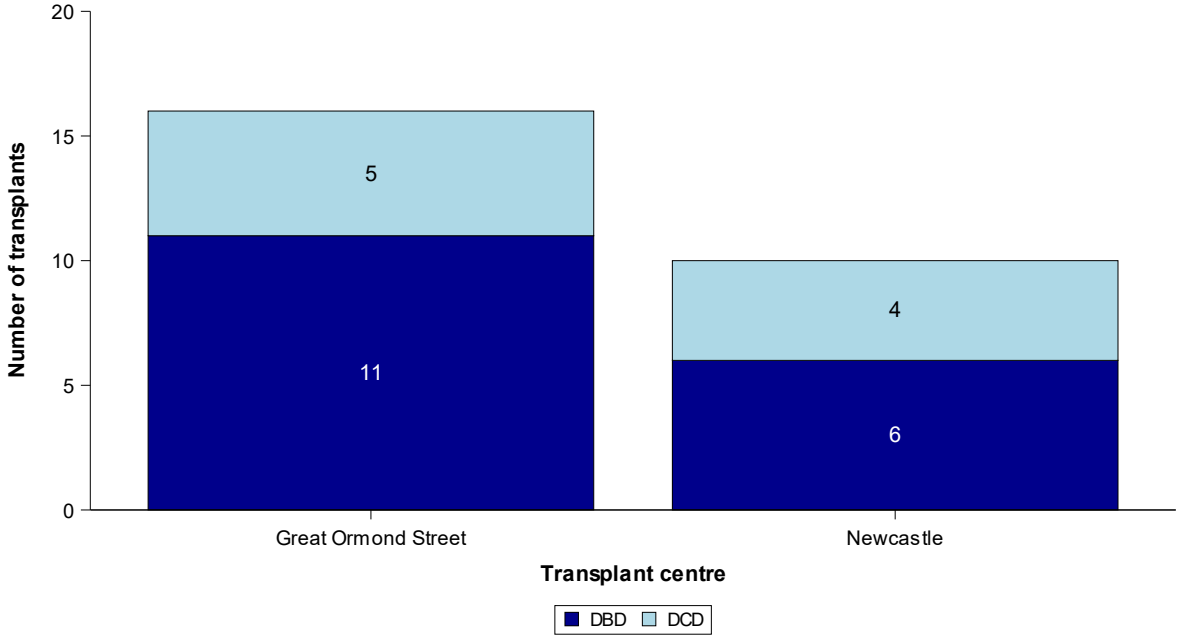


Figure 11.3 Number of paediatric heart transplants in the UK, by centre and donor type, 1 April 2024 to 31 March 2025



Figures 11.4 and **11.5** show the number of paediatric heart transplants performed in the last 10 years, by urgency status of recipient, nationally and by centre, respectively. The majority of transplants over the last 10 years were urgent, but in the most recent year, there were 10 super-urgent transplants. Last year's activity is shown by centre and urgency status in **Figure 11.6**.

Figure 11.4 Number of paediatric heart transplants in the UK, by financial year and urgency status, 1 April 2015 to 31 March 2025

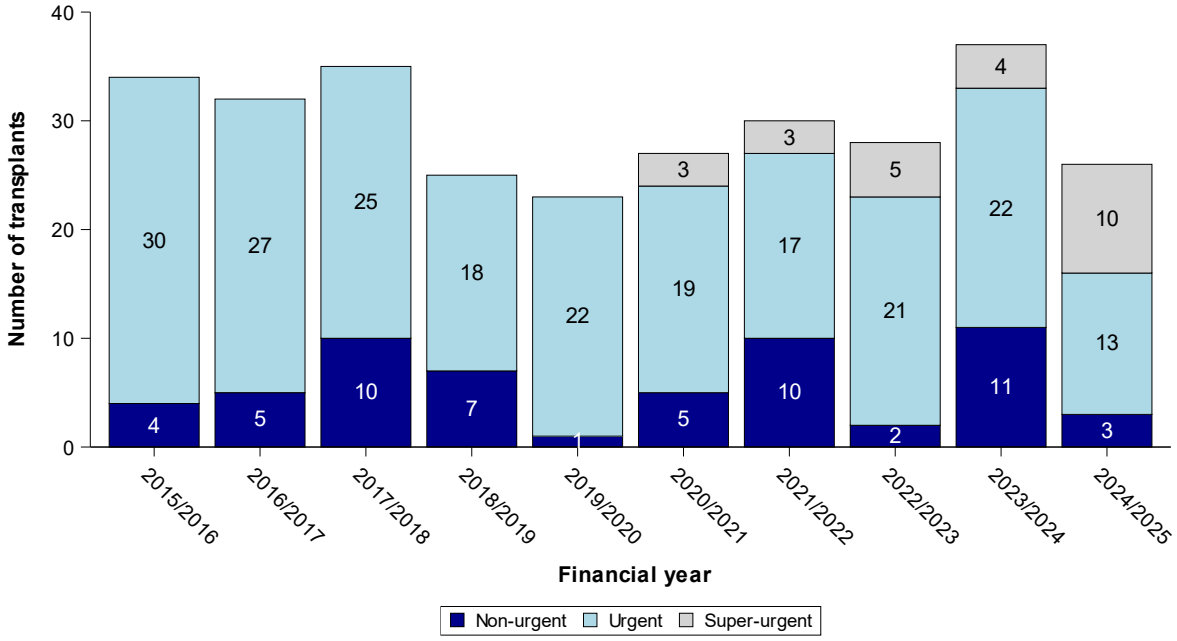


Figure 11.5 Number of paediatric heart transplants in the UK, by financial year, centre and urgency status, 1 April 2015 to 31 March 2025

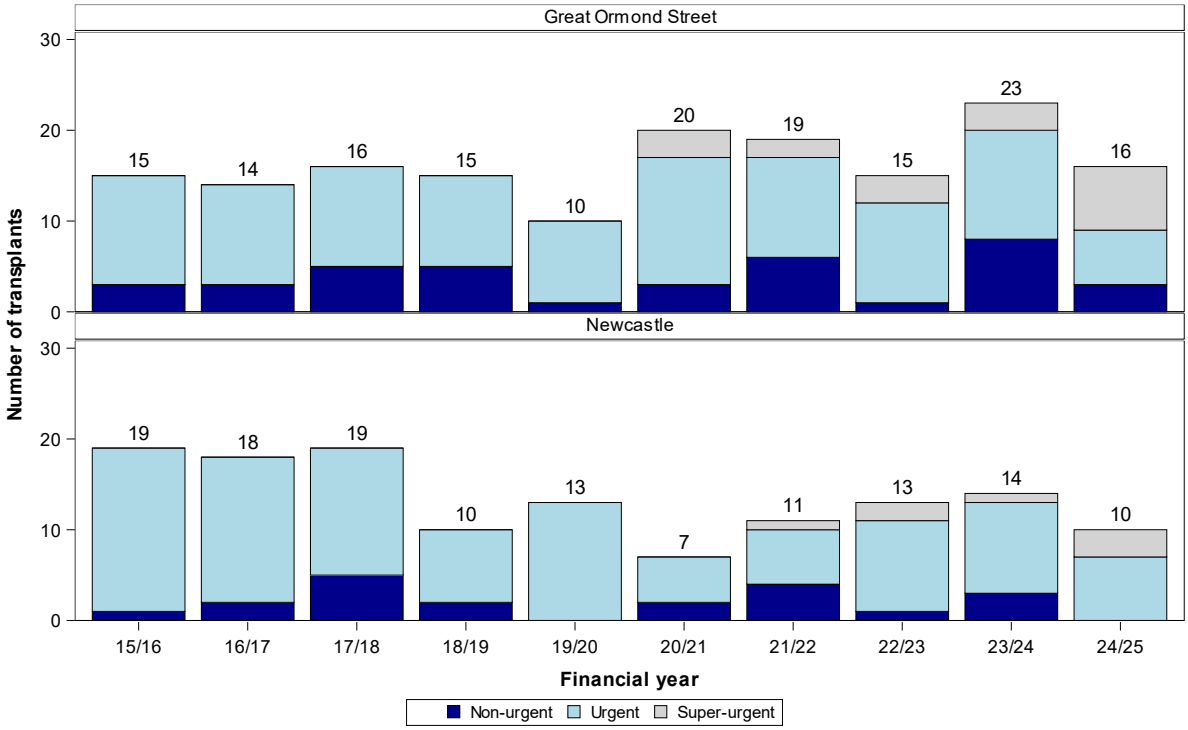
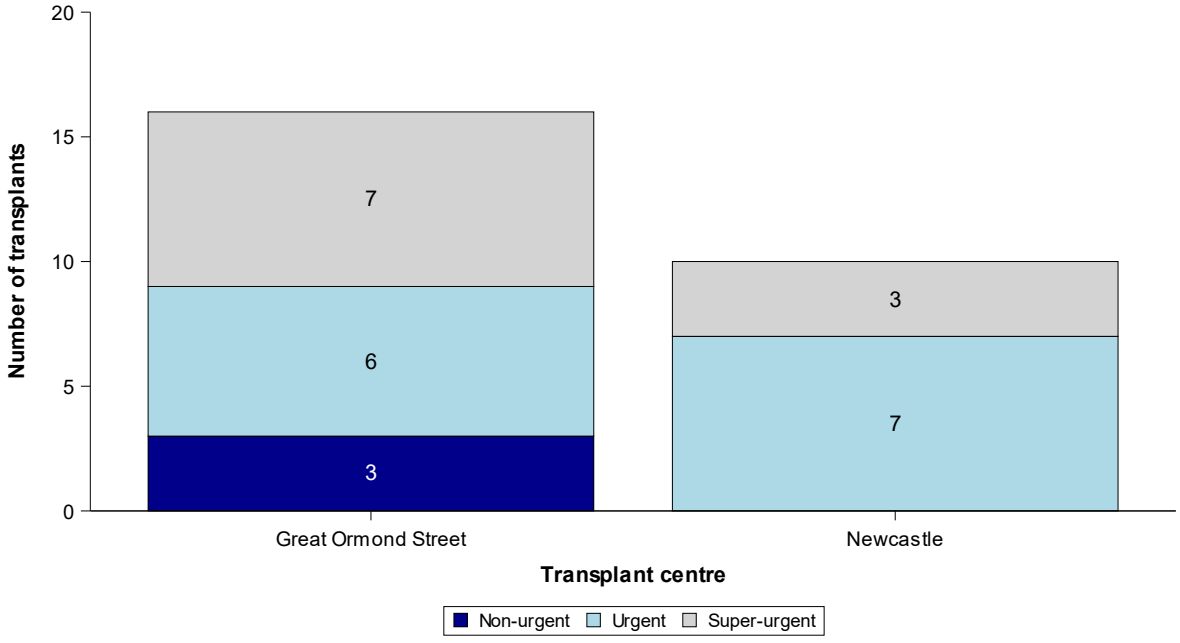


Figure 11.6 Number of paediatric heart transplants in the UK, by centre and urgency status, 1 April 2024 to 31 March 2025



11.2 Demographic characteristics of transplants, 1 April 2024 – 31 March 2025

The demographic characteristics of the 26 paediatric heart transplant recipients and donors in the latest year are shown by centre and overall in **Table 11.1**. Nationally, 58% of heart recipients were male and the median age was 12 years, while the median donor age was 15 years. For some characteristics, due to rounding, percentages may not add up to 100.

Table 11.1 Demographic characteristics of UK paediatric heart transplants performed between 1 April 2024 and 31 March 2025, by centre

		Great Ormond Street N (%)	Newcastle N (%)	**TOTAL N (%)**
Number of transplants		16 (100)	10 (100)	**26 (100)**
Urgency status at transplant	Non-urgent	3 (19)	0 (0)	**3 (12)**
	Urgent	6 (38)	7 (70)	**13 (50)**
	Super-urgent	7 (44)	3 (30)	**10 (39)**
Recipient sex	Male	9 (56)	6 (60)	**15 (58)**
	Female	7 (44)	4 (40)	**11 (42)**
Recipient ethnicity	White	10 (63)	5 (50)	**15 (58)**
	Asian	5 (31)	4 (40)	**9 (35)**
	Other	1 (6)	0 (0)	**1 (4)**
	Missing	0 (0)	1 (10)	**1 (4)**
Recipient age (years)	Median (IQR)	13 (9, 15)	9 (6, 10)	**12 (6, 13)**
	Missing	0	0	**0**
Recipient weight (kg)	Median (IQR)	45 (24, 54)	23 (19, 37)	**37 (20, 50)**
	Missing	0	0	**0**
Recipient primary disease	Cardiomyopathy	14 (88)	7 (70)	**21 (81)**
	Congenital heart disease	1 (6)	2 (20)	**3 (12)**
	Other	1 (6)	1 (10)	**2 (8)**
NYHA class	III	1 (6)	2 (20)	**3 (12)**
	IV	9 (56)	8 (80)	**17 (65)**
	Missing	6 (38)	0 (0)	**6 (23)**
Recipient in hospital	No	2 (13)	0 (0)	**2 (8)**
	Yes	8 (50)	10 (100)	**18 (69)**
	Missing	6 (38)	0 (0)	**6 (23)**
In hospital, recipient on ventilator	No	5 (63)	8 (80)	**13 (72)**
	Yes	3 (38)	2 (20)	**5 (28)**
In hospital, recipient VAD	None	6 (75)	6 (60)	**12 (67)**
	Left	1 (13)	3 (30)	**4 (22)**
	Right	1 (13)	0 (0)	**1 (6)**
	Both	0 (0)	1 (10)	**1 (6)**
In hospital, recipient TAH	No	8 (100)	10 (100)	**18 (100)**

Table 11.1 Demographic characteristics of UK paediatric heart transplants performed between 1 April 2024 and 31 March 2025, by centre

		Great Ormond Street N (%)	Newcastle N (%)	**TOTAL N (%)**
In hospital, recipient ECMO	No	5 (63)	9 (90)	**14 (78)**
	Yes	3 (38)	1 (10)	**4 (22)**
In hospital, recipient on inotropes	No	3 (38)	1 (10)	**4 (22)**
	Yes	5 (63)	9 (90)	**14 (78)**
In hospital, recipient IABP	No	8 (100)	10 (100)	**18 (100)**
Recipient CMV status	Negative	10 (63)	9 (90)	**19 (73)**
	Positive	5 (31)	1 (10)	**6 (23)**
	Missing	1 (6)	0 (0)	**1 (4)**
Recipient HCV status	Negative	10 (63)	10 (100)	**20 (77)**
	Missing	6 (38)	0 (0)	**6 (23)**
Recipient HBV status	Negative	10 (63)	10 (100)	**20 (77)**
	Missing	6 (38)	0 (0)	**6 (23)**
Recipient HIV status	Negative	10 (63)	10 (100)	**20 (77)**
	Missing	6 (38)	0 (0)	**6 (23)**
Recipient serum creatinine (umol/l)	Median (IQR)	61 (34, 65)	51 (26, 82)	**60 (30, 69)**
	Missing	6	0	**6**
Donor sex	Male	8 (50)	7 (70)	**15 (58)**
	Female	7 (44)	3 (30)	**10 (39)**
	Missing	1 (6)	0 (0)	**1 (4)**
Donor ethnicity	White	11 (69)	6 (60)	**17 (65)**
	Asian	0 (0)	1 (10)	**1 (4)**
	Other	1 (6)	0 (0)	**1 (4)**
	Missing	4 (25)	3 (30)	**7 (27)**
Donor age (years)	Median (IQR)	17 (13, 31)	13 (9, 16)	**15 (11, 24)**
	Missing	0	0	**0**
Donor BMI (kg/m^2)	Median (IQR)	21 (18, 23)	19 (17, 22)	**21 (18, 22)**
	Missing	0	0	**0**
Donor cause of death	Intracranial/CVA	10 (63)	5 (50)	**15 (58)**
	Trauma	1 (6)	1 (10)	**2 (8)**
	Others	5 (31)	4 (40)	**9 (35)**
Donor hypotension	No	4 (25)	7 (70)	**11 (42)**
	Yes	4 (25)	2 (20)	**6 (23)**
	Missing	8 (50)	1 (10)	**9 (35)**
Donor past diabetes	No	9 (56)	9 (90)	**18 (69)**
	Yes	1 (6)	1 (10)	**2 (8)**
	Missing	6 (38)	0 (0)	**6 (23)**

Table 11.1 Demographic characteristics of UK paediatric heart transplants performed between 1 April 2024 and 31 March 2025, by centre

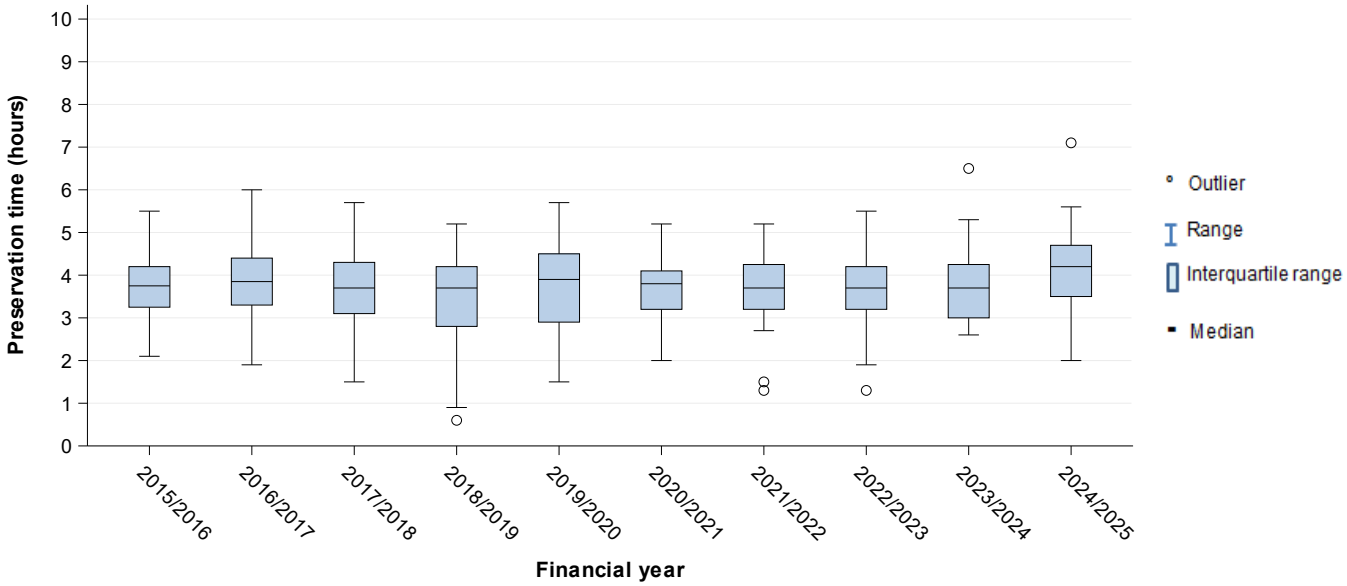
		Great Ormond Street N (%)	Newcastle N (%)	**TOTAL** **N (%)**
Donor past cardio disease	No	12 (75)	7 (70)	**19 (73)**
	Missing	4 (25)	3 (30)	**7 (27)**
Donor past hypertension	No	10 (63)	10 (100)	**20 (77)**
	Missing	6 (38)	0 (0)	**6 (23)**
Donor past tumour	No	9 (56)	10 (100)	**19 (73)**
	Yes	1 (6)	0 (0)	**1 (4)**
	Missing	6 (38)	0 (0)	**6 (23)**
Donor past smoker	No	9 (56)	9 (90)	**18 (69)**
	Yes	1 (6)	1 (10)	**2 (8)**
	Missing	6 (38)	0 (0)	**6 (23)**
Total preservation time (hours)[1]	Median (IQR)	4.2 (3.6, 4.6)	4.4 (3.8, 5.2)	**4.3 (3.6, 4.8)**
	Missing	7	1	**8**

[1] Time from cross clamp in the donor to reperfusion in the recipient, regardless of donor type

11.3 Total preservation time, 1 April 2015 – 31 March 2025

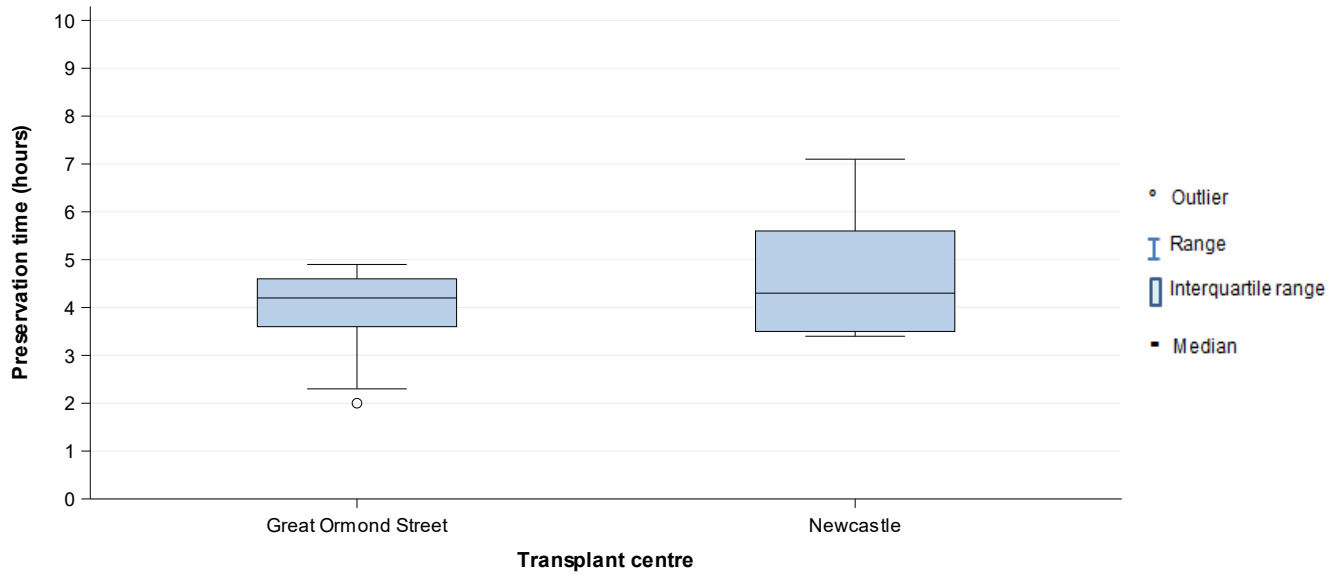
Figure 11.7 shows boxplots of total preservation time for DBD donor hearts transplanted into paediatric recipients over the last 10 years. The total preservation time is the difference between donor cross-clamp and recipient reperfusion and can be considered the out of body time. Total preservation time was reported for 242 out of 264 paediatric DBD heart transplants. Of those 242, 3 (1%) donor hearts underwent machine perfusion. The national median total preservation time varied between 3.7 and 4.2 hours over the decade with a recent upward trend. **Figure 11.8** and **Figure 11.9** show boxplots of total preservation time by centre in the latest financial year (2024/2025) and over the last 10 years, respectively.

Figure 11.7 Boxplots of total preservation time for DBD donor hearts transplanted into paediatric recipients, by financial year, 1 April 2015 to 31 March 2025



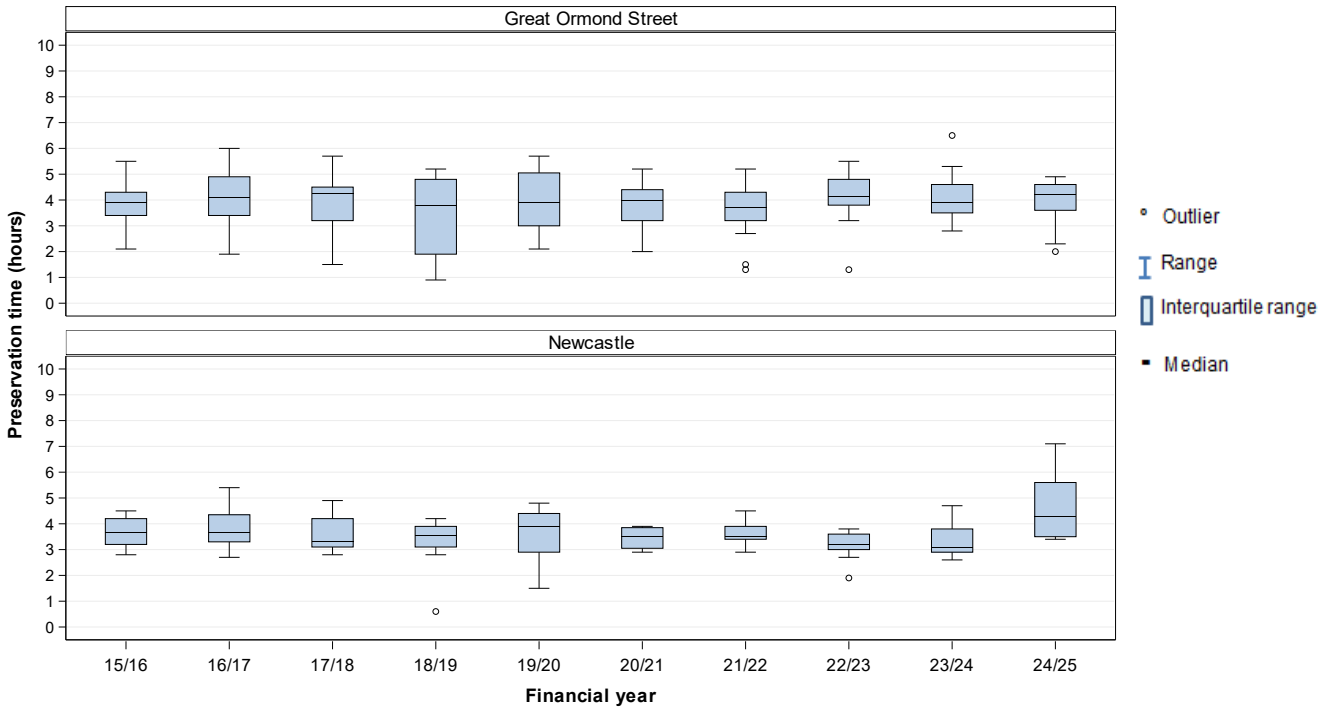
Note: No adjustment has been made for the use of organ machine perfusion which was reported in 3 transplants in 2024/2025

Figure 11.8 Boxplots of total preservation time for DBD donor hearts transplanted into paediatric recipients, by transplant centre, 1 April 2024 to 31 March 2025



Note: Hypothermic oxygenated perfusion was used in 3 paediatric DBD heart transplants at Newcastle in 2024/2025

Figure 11.9 Boxplots of total preservation time for DBD donor hearts transplanted into paediatric recipients, by transplant centre and financial year, 1 April 2015 to 31 March 2025



Note: No adjustment made for use of organ machine perfusion which was reported in 3 cases at Newcastle in 2024/2025

PAEDIATRIC HEART TRANSPLANTATION

Post-Transplant Survival

12. Post-Transplant Survival

The survival analyses presented in this section exclude multi-organ transplants and include first time transplants only. **Section 12.1** includes DBD and DCD heart transplants where 90-day and 1-year survival rates are based on transplants performed in the period 1 April 2020 to 31 March 2024 and 5-year survival rates are based on transplants performed in the 1 April 2016 to 31 March 2020. **Section 12.2** summarises survival following DCD heart transplant for the small number of paediatric recipients of DCD hearts.

12.1 Survival post heart transplant

The 90-day post-transplant unadjusted patient survival rates for each centre and nationally are shown in **Table 12.1** for the 117 first paediatric heart only transplants in the period 1 April 2020 to 31 March 2024. There was no statistically significant difference in unadjusted survival rates between Great Ormond Street Hospital and Newcastle (log-rank test, p=0.10).

Table 12.1 90 day patient survival after first paediatric heart transplant, by centre, 1 April 2020 to 31 March 2024

Centre	Number of transplants	Number of deaths	% 90 day survival (95% CI) (unadjusted)	
Great Ormond Street	76	2	97.4	(89.9 - 99.3)
Newcastle	41	5	87.8	(73.2 - 94.7)
UK	**117**	**7**	**94.0**	**(87.9 - 97.1)**

The 1 year post-transplant unadjusted survival rates are shown in **Table 12.2**. There was no statistically significant difference in unadjusted survival rates between Great Ormond Street Hospital and Newcastle (log-rank test, p=0.24).

Table 12.2 1 year patient survival after first paediatric heart transplant, by centre, 1 April 2020 to 31 March 2024

Centre	Number of transplants	Number of deaths	% 1 year survival (95% CI) (unadjusted)	
Great Ormond Street	76	3	95.7	(87.1 - 98.6)
Newcastle	41	5	87.8	(73.2 - 94.7)
UK	**117**	**8**	**92.9**	**(86.3 - 96.4)**

The 5 year survival rates were estimated from the 113 first paediatric heart only transplants performed in the period 1 April 2016 to 31 March 2020. The unadjusted patient survival rates are shown in **Table 12.3**. There was no statistically significant difference in unadjusted survival rates between Great Ormond Street Hospital and Newcastle (log-rank test, p=0.32).

Table 12.3 5 year patient survival after first paediatric heart transplant, by centre, 1 April 2016 to 31 March 2020

Centre	Number of transplants	Number of deaths	% 5 year survival (95% CI) (unadjusted)	
Great Ormond Street	54	5	90.3	(78.1 - 95.8)
Newcastle	59	11	81.4	(68.9 - 89.2)
UK	**113**	**16**	**85.7**	**(77.7 – 91.0)**

12.2 Survival post DCD heart transplant

The survival outcomes of paediatric recipients of DCD heart only transplants in the period 1 April 2016 and 31 March 2024 are summarised in **Table 12.4**, at 90 days and 1 year post-transplant.

Table 12.4 Survival outcomes after first DCD paediatric heart only transplant, by centre, 1 April 2016 and 31 March 2024

Centre	Number of transplants	Number of patients alive at 90 days post-transplant[1]	Number of patients alive at 1 year post-transplant[2]
Great Ormond Street Hospital	15	14	14
Newcastle	7	6	6
UK	**22**	**20**	**20**

[1] Patients reported alive after 75 days post-transplant assumed alive at 90 days
[2] Patients reported alive after 10 months post-transplant assumed alive at 1 year

PAEDIATRIC HEART TRANSPLANTATION

Form Return Rates

13. Paediatric heart form return rates, 1 January – 31 December 2024

Form return rates are reported in **Table 13.1** for the cardiothoracic transplant record and the 3 month and 1 year follow up form, along with lifetime follow up (2 years or more). These include all paediatric heart transplants between 1 January and 31 December 2024 for the transplant record, and all follow up forms issued in this time period. There were a small number of lifetime follow-up forms outstanding.

Table 13.1 Form return rates for paediatric heart transplants, 1 January 2024 to 31 December 2024

Centre	Transplant record		3 month follow-up		1 year follow-up		Lifetime follow-up	
	No. requested	% returned	No. requested	% returned	No. requested	% returned	No. requested	% returned
Great Ormond Street Hospital	17	100	23	100	21	100	103	94
Newcastle, Freeman Hospital	13	100	11	100	12	100	206	99
Overall	**30**	**100**	**34**	**100**	**33**	**100**	**309**	**97**

APPENDIX

A1: Number of patients analysed

The cohort of patients in this report varies by section/analysis. Tables **A1.1** and **A1.2** below summarise the number of adult and paediatric (respectively) transplants in each cohort and the section this applies to. For the survival from listing analysis, see the Methods section in **A2** below.

Table A1.1 Adult transplants analysed

Time period	Report Section	Exclusion criteria	No. heart transplants
1 April 2015 – 31 March 2025	• Introduction	None	1681
1 April 2015 – 31 March 2025	• Transplants	• Multi-organ transplants	1628
1 April 2020 – 31 March 2024	Post-transplant survival – • 90-day • 1-year survival	• Multi-organ transplants • DCD heart transplants excluded from risk-adjusted analysis • Heart-lung transplants • Second (or more) transplants • Group 2 transplants	653 (491 DBD)
1 April 2016 – 31 March 2020	Post-transplant survival – • 5-year survival	• Multi-organ transplants • DCD heart transplants excluded from risk-adjusted analysis • Heart-lung transplants • Second (or more) transplants • Group 2 transplants	627 (538 DBD)

Table A1.2 Paediatric transplants analysed

Time period	Report Section	Exclusion criteria	No. heart transplants
1 April 2015 – 31 March 2025	• Introduction	None	300
1 April 2015 – 31 March 2025	• Transplants	• Multi-organ transplants	297
1 April 2020 – 31 March 2024	Post-transplant survival – • 90-day • 1-year survival	• Multi-organ transplants • Heart-lung transplants • Second (or more) transplants • Group 2 transplants	117
1 April 2016 – 31 March 2020	Post-transplant survival – • 5-year survival	• Multi-organ transplants • Heart-lung transplants • Second (or more) transplants • Group 2 transplants	113

Geographical variation analysis

Registration rates

All NHS group 1 patients who were registered onto the heart transplant list with an active status between 1 April 2024 and 31 March 2025 were extracted from the UK Transplant Registry on 16 June 2025 (numerator). Patients registered for a heart-lung block were excluded. Patients were assigned to NHS regions in England using their postcode of residence, as reported at registration. The number of registrations per million population (pmp) by NHS region was obtained using mid-2022 population estimates based on the Office for National Statistics (ONS) 2021 Census figures (denominator). No NHS region age- or sex-specific standardisation of rates was performed.

The registration rates pmp were categorised into four groups – low, low-medium, medium-high and high – based on the quartiles of their distribution and visualised in a map using contrasting colours.

Transplant rates

Transplant rates pmp were obtained as the number of heart transplants on NHS group 1 recipients between 1 April 2024 and 31 March 2025 (numerator), divided by the mid-2022 population estimates from the ONS (denominator). Patients who received a heart-lung block transplant were excluded. Transplant rates pmp were categorised and visualised in a map as done for the registration rates.

Systematic component of variation

Only registrations or transplants in England between 1 April 2024 and 31 March 2025 were included. If a patient was re-registered during the time period, only the first registration was considered. If a patient underwent more than one heart transplant in the time period, only the first transplant was considered.

A2: Methods

Offer decline rates

The offer decline rate analysis was limited to heart offers from DBD donors who died at a UK hospital and the heart was eventually accepted and transplanted. Any offers from DCD donors were excluded.

Funnel plots were used to compare centre specific offer decline rates and indicate how consistent the rates of the individual transplant centres are with the national rate. The overall national offer decline rate is shown by the solid line while the 95% and 99.8% confidence lines are indicated via a thin and thick dotted line, respectively. Each dot in the plot represents an individual transplant centre. Centres that are positioned above the upper limits indicate on offer decline rate that is higher than the national rate, while centres positioned below the lower limits indicates on offer decline

Unadjusted post-transplant survival rates

Kaplan-Meier methods were used to estimate the unadjusted patient survival rates. Patients can be included in this method of analysis irrespective of the length of follow-up recorded. If a patient is alive at the end of the follow-up then information about the survival of the patient is censored.

Risk-adjusted post-transplant survival rates

A risk-adjusted survival rate is an estimate of what the survival rate at a centre would have been if they had had the same mix of patients as that seen nationally. The risk-adjusted rate therefore presents estimates in which differences in patient mix across centres have been removed as much as possible. For that reason, it is valid to only compare centres using risk-adjusted rather than unadjusted rates, as differences among the latter can be attributed to differences in patient mix.

Risk-adjusted survival estimates were obtained through indirect standardisation. A Cox Proportional Hazards model was used to determine the probability of survival for each patient based on their individual risk factor values. The sum of these probabilities for all patients at a centre gives the number, E, of patients or grafts expected to survive at least 1 year or 5 years after transplant at that centre. The number of patients who actually survive the given time period is given by O. The risk-adjusted estimate is then calculated by multiplying the ratio O/E by the overall unadjusted survival rate across all centres. The risk-adjustment models used were developed in consultation with clinicians and were based on statistical significance as well as previous studies of factors affecting the survival rates of interest. The factors included in the models are shown in **A3**.

Missing values for risk factors were imputed using simple imputation of the median or most common group for the adult heart model (where missing values represented <10% of the cohort). Missing ischaemia time (5% of cohort) was imputed with a centre and year specific median

Funnel plots
The funnel plot is a graphical method to show how consistent the survival rates of the different transplant centres are compared to the national rate. The graph shows for each centre, a survival rate plotted against the number of transplants undertaken, with the national rate and confidence limits around this national rate superimposed. In this report, 95% and 99.8% confidence limits were used. Units that lie within the confidence limits have survival rates that are statistically consistent with the national rate. When a unit is close to or outside the limits, this is an indication that the centre may have a rate that is considerably different from the national rate.

Systematic component of variation
For a given individual who is a resident in a given NHS region, registration to the transplant list is modelled as a Bernoulli trial. At the whole area level, this becomes a Binomial process which can be approximated by a Poisson distribution when rare events are modelled. Transplant counts follow similar assumptions.

To allow for the possibility that, even after allowing for area-specific Poisson rates, area differences remain, introduce an additional multiplicative rate factor which varies from area to area. Postulate a non-parametric distribution for the multiplicative factor, with variance σ^2. If the factor is one for all areas, then area differences are fully explained by the area-specific Poisson rate. If the factor varies with a nonzero variance, σ^2, then we conclude that there are unexplained area differences.

The systematic component of variation (SCV; McPherson *et al., N Engl J Med* 1982, **307:** 1310-4) is the moment estimator of σ^2. Under the null hypothesis of homogeneity across areas, the SCV would be zero. The SCV, therefore, allows us to detect variability across areas beyond that expected by chance; the larger the SCV, the greater the evidence of systematic variation across areas.

Survival from listing
Data were obtained for all patients ≥ 18 years registered for the first time for a heart transplant between 1 April 2019 and 31 March 2023 for one-year survival, and 1 April 2015 and 31 March 2019 for five-year survival. Survival time was defined as the time from joining the transplant list to death, regardless of the length of time on the transplant list, whether or not the patient was transplanted and any factors associated with such a transplant e.g. donor type. Survival time was censored at either the date of removal from the list, or at the last known follow up date post-transplant when no death date was recorded, or on 21 July 2024 if the patient was on the transplant list at time of analysis. However, removals due to deteriorating condition were classed as events.

Exclusions from the analysis:
- patient registered for a heart-lung block or other multi-organ transplant
- patients who were not listed prior to transplant
- patients first registered on another transplant list (e.g. kidney list)
- patients registered outside the UK or not entitled to NHS treatment
- adult patients registered at GOSH

Patients registered for a heart transplant who were non-urgent and then urgently listed on the same day (or vice-versa) were recorded as urgent at registration. Patients who received a VAD and were registered on the transplant list on the same day were assumed to have received the VAD prior to registration.

In risk-adjusted survival analysis, factors recorded at time of transplant listing were adjusted for. These are detailed in **Table A2.1** and were included in the modelling whether or not statistically significant. Missing data for these risk factors have been imputed using the median or modal value to ensure that cases with missing data are not excluded from the risk-adjusted analysis.

Table A2.1	**Factors used in risk-adjusted model for patient survival from listing**
Heart	Age, blood group, urgency status (non-urgent vs urgent/super-urgent), Mechanical Circulatory Support (MCS) at registration (none/long-term/short-term), diabetes, height, bilirubin (logarithm)

Survival rates at 1 and 5 years post registration were calculated from the risk adjusted survival rate (RASR), obtained as 1 – {observed number of deaths in follow up period/expected number) x national mortality rate}. The expected survival rates were estimated from fitting a Cox model to the national data, excluding transplant centre, evaluated at each patient's observed survival time. Interval estimates for 1 and 5 year rates, and the significance of differences between them across centres, were found using Poisson regression models for the logarithm of the observed number of deaths, with centre as a random effect.

A3: Risk models

Table A3.1 Risk factors and categories used in the adult heart risk adjusted 90-day, 1-year and 5-year survival models	
Donor age	(modelled as continuous variable)
Recipient age 60 or over	Yes No
Recipient CMV status	Positive Negative
Recipient bilirubin at registration	(continuous, logged)
VAD at transplant	Short-term (including ECMO) Long-term (including total artificial hearts) None
Recipient IABP at transplant	Yes No
Primary disease group	Cardiomyopathy Coronary heart disease Congenital heart disease Other
Recipient eGFR group at transplant	44 ml/min or below 45-59 ml/min 60-89 ml/min 90 or above
Recipient diabetes at registration	Yes No
Recipient hypertension at registration	Yes No
Recipient blood group	O A B AB
Total preservation time (hours)	(modelled as continuous variable)
OCS used on heart	Yes No
Interaction between ischaemia time and OCS	

A4: Glossary of terms

Active transplant list
When a patient is registered for a transplant, they are registered on what is called the 'active' transplant list. This means that when a donor organ becomes available, the patient is included among those who are matched against the donor to determine whether or not the organ is suitable for them. It may sometimes be necessary to take a patient off the transplant list, either temporarily or permanently. This may be done, for example, if someone becomes too ill to receive a transplant. The patient is told about the decision to suspend them from the list and is informed whether the suspension is temporary or permanent. If a patient is suspended from the list, they are not included in the matching of any donor organs that become available.

Boxplots
The length of the box in this plot represents the inter-quartile range. The line inside the box indicates the median value. The vertical lines issuing from the box are called the whiskers and indicate the range of values that are outside of the inter-quartile range but are close enough not to be considered outliers. The circles that are outside the box indicate the outliers (any points that are a distance of more than 1.5*IQR from the box).

Case mix
The types of patients treated at a unit for a common condition. This can vary across units depending on the facilities available at the unit as well as the types of people in the catchment area of the unit. The definition of what type of patient a person is depends on the patient characteristics that influence the outcome of the treatment.

Confidence interval (CI)
When an estimate of a quantity such as a survival rate is obtained from data, the value of the estimate depends on the set of patients whose data were used. If, by chance, data from a different set of patients had been used, the value of the estimate may have been different. There is therefore some uncertainty linked with any estimate. A confidence interval is a range of values whose width gives an indication of the uncertainty or precision of an estimate. The number of transplants or patients analysed influences the width of a confidence interval. Smaller data sets tend to lead to wider confidence intervals compared to larger data sets. Estimates from larger data sets are therefore more precise than those from smaller data sets. Confidence intervals are calculated with a stated probability, usually 95%. We then say that there is a 95% chance that the confidence interval includes the true value of the quantity we wish to estimate.

Confidence limit
The upper and lower bounds of a confidence interval.

Cox Proportional Hazards model
A statistical model that relates the instantaneous risk (hazard) of an event occurring at a given time point to the risk factors that influence the length of time it takes for the event to occur. This model can be used to compare the hazard of an event of interest, such as patient death, across different groups of patients.

Donor after brain death (DBD)
Donation after brainstem death means donation which takes place following the diagnosis of death using neurological criteria.

Donor after circulatory death (DCD)
Donation after circulatory death means donation which takes place following the diagnosis of death using circulatory criteria.

Funnel plot
A graphical method that shows how consistent the rates, such as survival rates or decline rates, of the different transplant units are compared to the national rate. For survival rates, the graph shows for each unit, a survival rate plotted against the number of transplants undertaken, with the national rate and confidence limits around this national rate superimposed. In this report, 95% and 99.8% confidence limits were used. Units that lie within the confidence limits have survival rates that are statistically consistent with the national rate. When a unit is close to or outside the limits, this is an indication that the centre may have a rate that is considerably different from the national rate.

Inter-quartile range
The values between which the middle 50% of the data fall. The lower boundary is the lower quartile, the upper boundary the upper quartile.

Kaplan-Meier method
A method that allows patients with incomplete follow-up information to be included in estimating survival rates. For example, when estimating 1 year patient survival rates, a patient may be followed up for only 9 months before they relocate. If we calculated a crude survival estimate using the number of patients who survived for at least a year, this patient would have to be excluded as it is not known whether or not the patient was still alive at 1 year after transplant. The Kaplan-Meier method allows information about such patients to be used for the length of time that they are followed-up, when this information would otherwise be discarded. Such instances of incomplete follow-up are not uncommon and the Kaplan-Meier method allows the computation of estimates that are more meaningful in these cases. The Kaplan-Meier method can be used for any time to event analysis, including time to transplant. If not enough events have occurred or if there are not enough patients in the cohort, an estimate of the median may not be possible.

Long-term device
Long-term devices are implantable and intended to support the patient for years. Patients can be discharged from hospital with a long-term device.

Mechanical Circulatory Support
An umbrella term for devices used to assist the heart, including long-term devices such as implantable VADs for left, right and biventricular support and total artificial hearts, and short-term devices such as CentriMag, percutaneous VADs and extracorporeal membrane oxygenation (ECMO).

Median
The midpoint in a series of numbers, so that half the data values are larger than the median, and half are smaller.

Multi-organ transplant
A transplant in which the patient receives more than one organ. For example, a patient may undergo a transplant of a heart and kidney.

Patient survival rate
The percentage of patients who are still alive (whether the graft is still functioning or not). This is usually specified for a given time period after transplant. For example, a five-year patient survival rate is the percentage of patients who are still alive 5 years after their first transplant.

***p* value**
In the context of comparing survival rates across centres, the *p* value is the probability that the differences observed in the rates across centres occurred by chance. As this is a probability, it takes values between 0 and 1. If the *p* value is small, say less than 0.05, this implies that the differences are unlikely to be due to chance and there may be some identifiable cause for these differences. If the *p* value is large, say greater than 0.1, then it is quite likely that any differences seen are due to chance.

Risk-adjusted survival rate
Some transplants have a higher chance than others of failing at any given time. The differences in expected survival times arise due to differences in certain factors, the risk factors, among patients. A risk-adjusted survival rate for a centre is the expected survival rate for that centre given the case mix of their patients. Adjusting for case mix in estimating centre-specific survival rates allows valid comparison of these rates across centres and to the national rate.

Risk factors
These are the characteristics of a patient, transplant or donor that influence the length of time that a graft is likely to function or a patient is likely to survive following a transplant. For example, when all else is equal, a transplant from a younger donor is expected to survive longer than that from an older donor and so donor age is a risk factor.

Unadjusted survival rate
Unadjusted survival rates do not take account of risk factors and are based only on the number of transplants at a given centre and the number and timing of those that fail within the post-transplant period of interest. In this case, unlike for risk-adjusted rates, all transplants are assumed to be equally likely to fail at any given time. However, some centres may have lower unadjusted survival rates than others simply because they tend to undertake transplants that have increased risks of failure. Comparison of unadjusted survival rates across centres and to the national rate is therefore inappropriate.

VAD
Ventricular Assist Device. A mechanical pump used to increase the amount of blood that flows through the body, relieving the symptoms of advanced heart failure.

Prepared by:

Statistics and Clinical Research, NHS Blood and Transplant

Miguel Reyes
Paul Smith
Sally Rushton